THE ENGINEERING AND MINING JOURNAL

Entered at the Post-Office of New York, N. Y., as Second-Class Matter.

VOL. XXXVI. No. 1.

RICHARD P. ROTHWELL, C.E., M.E.,
ROSSITER W. RAYMOND, Ph.D.,
CHARLES KIRCHHOFF, Jr., M.E., } Editors.

NOTE.—Communications relative to the editorial management should be addressed to EDITOR, P.O. Box 1833, New York.

Communications for Mr. RAYMOND should be addressed to ROSSITER W. RAYMOND P.O. Box 1465, New York. Articles written by Mr. RAYMOND will be signed thus * ; and only for articles so signed is he responsible.

SUBSCRIPTION PRICE, including postage, for the United States and Canada, $4 per annum ; $2.25 for six months ; all other countries, including postage, $5.00 = 20s. = 25 francs = 20 marks. All payments must be made in advance.

FILE COVERS will be sent by mail for $1.25 or delivered at office for $1 each.

Advertising Rates.—See page vii.

Mr. C. A. Green is our accredited representative for New York.

Mr. A. R. Brown, Jr., is our accredited representative for Boston and the Eastern States. Office, Room 1, Simmons Building, 40 Water street, Boston.

Mr. J. Viennot, 150 South Fourth street, Philadelphia, is our accredited representative for Philadelphia.

Mr. A. H. Taylor, 159 Lake street, Chicago, is our accredited representative for Chicago and the Northwest.

Mr. O. D. Cotton, Columbus, O., is our accredited representative for Ohio, Kentucky, and Indiana.

Mr. O. J. Frost, care Boston & Colorado Smelting Company, Argo, Colo., is our accredited representative for Denver and vicinity.

REMITTANCES should always be made by Post-Office Orders or Bank Drafts on New York, made payable to THE SCIENTIFIC PUBLISHING COMPANY.

THE SCIENTIFIC PUBLISHING CO., Publishers.

R. P. ROTHWELL, Pres. HENRY M. GEER, Sec. and General Manager.

P.O. Box 1833. 27 Park Place, New York.

CONTENTS.

EDITORIALS :	PAGE.
The Detroit Meeting of the United States Association of Charcoal Iron-Workers	1
Mr. Sydney Gilchrist Thomas	1
The Minneapolis Meeting of the American Association for the Advancement of Science	1
Steel Castings for Ship-Building Purposes	1
Editorial Correspondence : The New Rocky Mountain Line	1
Steel Castings in Place of Iron and Steel Forgings	2
The Consumption of Chemicals by the Alazarine Industry	3
Peroxide of Hydrogen and its Industrial Application	3
Bessemerizing Copper Matte	4
A Reply to Mr. C. A. Stetefeldt	4
The Working of Strontian in Sicily	6
Loads and Strains on Hoisting Ropes	6
Glass-Blowing by Compressed Air	6
Furnace, Mill, and Factory	7
NOTES :	
Phosphorus in Nickel	6
The Transportation of Explosives	6

GENERAL MINING NEWS :	PAGE.
Arizona	7
California	7
Canada	7
Central America	7
Colorado	7
Dakota	8
Georgia	8
Idaho	8
Mexico	8
Michigan	8
Minnesota	8
Missouri	8
Montana	8
Nevada	8
Utah	9
Patents Granted by the United States Patent-Office	9
FINANCIAL :	
Gold and Silver Stocks	9
BULLION MARKET	10
METALS	10
IRON MARKET REVIEW	10
COAL TRADE REVIEW	11
STATISTICS OF COAL PRODUCTION	12
FREIGHTS	12
Advertisers' Index	xii

THE United States Association of Charcoal Iron-Workers will hold its next meeting at Detroit, Mich., beginning August 13th.

MR. SYDNEY GILCHRIST THOMAS, the inventor of the basic process, sailed for England to-day, after a very brief stay in this country. He has been traveling in India and Australia for his health.

THE thirty-second meeting of the American Association for the Advancement of Science will be held at Minneapolis, Minn., from August 15th to August 21st. Hon. GEORGE A. PILLSBURY is chairman and Prof. N. H. WINCHELL secretary of the local committee.

WE print elsewhere an abstract of a paper by Mr. PARKER, of Lloyd's, on steel castings for ship-building purposes, which apparently closely reflects the opinions held by the most prominent steel-makers and metallurgists abroad on the important subject of casting steel. In our own country, in a quiet way, considerable progress has been made during the past few years ; and for a great number and variety of purposes, steel cast directly into the form in which it is to be used has found a ready application. Any one acquainted with the valuable properties of steel, and knowing the cost of shaping it by machine tools into the desired form, will fully appreciate what a great end those who are devoting attention to this subject are working for. There are two obstacles which must be overcome : the first to produce dense castings free from blow-holes and other defects ; and the second, to give them at once a finish that will approach the smoothness of good iron castings. Success in meeting the latter and, to some extent, the former requirement hinges upon the selection of a suitable material for the mold. The earlier methods of making steel castings were those of REPEE, who sold his patent to the VICKERS, of Sheffield, England, and of HAINSWORTH, of Pittsburg, under whose patents a number of establishments in this country are working. The first consists in making molds from old clay crucibles, pulverized, with an addition of twenty per cent of black-lead, baking them in a furnace, and coating them with coal-tar, the steel being poured into them while still hot. The principal objection to the Repee process and to all other molds in which carbon is largely used, is, that it is impossible to make castings of soft steel. As soon as the hot metal comes into contact with molds made of such mixtures, it absorbs a portion of the carbon. The Repee castings, too, are not smooth, and require considerable grinding and chiseling, or "fettling," as it is called in England ; and though all such castings must be annealed before use, their surface nevertheless lacks ductility. With a view to remedying these defects, Mr. GEORGE COWING, of Cleveland, a number of years ago made a series of experiments at the Otis & Cleveland Rolling-Mill Company's steel mills, during the course of which two points of importance were brought out. It was found that the ordinary molding materials would not stand the heat of liquid steel without fluxing more or less, so that the castings produced were always heavily coated with scabs and slag, and were filled with blow-holes caused by the impossibility of allowing the gas to escape through the walls of the mold. Mr. COWING found that the best material meeting these objections was one which contains a maximum amount of silica and an immense quantity of substances capable of causing fluxing. He uses the purest quartz or sand, roasts it, and stamps it to an almost impalpable powder ; and in order to permit handling the mold, moistens it with thin glue-water to the temper of ordinary molding-sand.

Experience in nearly all of the large works of the United States and several of the most noted establishments of England, during the past four years, has thoroughly demonstrated that solid and smooth castings can be made in the Cowing silica molds from any grade or variety of steel. Castings have been made in these molds from Bessemer, Siemens-Martin, and crucible steel. At the Otis works in Cleveland, mild steel having but one tenth per cent of carbon has been cast in them into articles that have been bent double without annealing. Liquid steel of this character is the hottest metal known to metallurgy ; and yet it apparently makes no impression on the silica molds, the castings coming out of the sand bright and so clean that no work is required on them, further than a good brushing. We understand that at the present time twenty-three of the largest steel plants in the United States are making steel under the Cowing patent, and two special plants are now going up to make castings by this method : one, by Messrs. JOHN ROACH & RYDER on the Delaware, and another, of which Mr. S. T. WELLMAN, of Cleveland, is at the head, at Alliance, Ohio. Messrs. ROACH & RYDER intend to use the process largely in making heavy castings to take the place of forgings, such as armor plates, shafts, cranks, etc., for vessels.

It will be seen, therefore, that American engineers and iron-masters have not been idle, and that they are fully awake to the difficulties of the problems presented, and are rapidly progressing toward the attainment of this important end.

EDITORIAL CORRESPONDENCE.

The New Rocky Mountain Line.

Having just made the trip from Salt Lake City to this place by the Denver & Rio Grande line, I can not write you on any other subject at present. There is not in the world a railroad journey of thirty hours so filled with grand and beautiful views. I should perhaps qualify this statement by deducting the hours of darkness ; yet this is really a fortunate enhancement of the traveler's enjoyment : it seems providential, that there is one part of the way, just long enough and uninteresting enough to permit one to go to sleep without the fear of missing any thing sublime. Leaving Salt Lake City at noon, we sped through the fertile and populous Jordan Valley, past the fresh and lovely Utah Lake, and up the valley of Spanish Fork. All the way, the superb granite walls and summits of the Wahsatch accompanied us on the east, while westward, across the wide valley, were the blue outlines of the Oquirrh range. One after another of the magnificent cañons of the Wahsatch we passed, their mouths seeming mere gashes in the massive rock, but promising wild and rugged variety to him who enters—a promise which I have abundantly tested in other days. Parley's Cañon, the Big and Little Cottonwood, and, most wonderful of all, the cañon of the American Fork, form a series not inferior to those of Boulder, Clear Creek, the Platte, and the Arkansas, in the front range of the Rockies.

Following Spanish Fork eastward so far as it served our purpose, we crossed the divide to the head-waters of the South Fork of Price River, a

tributary of Green River. It was a regret to me, in choosing this route, that I should miss the familiar and beloved scenery of Weber and Echo cañons—the only part of the Union Pacific road which tempts one to look out of the car-window, unless one may be tempted by the boundless monotony of the plains or the chance of a prairie-dog. Great was my satisfaction, therefore, to find that this part of the new road, parallel with the Union Pacific, but a hundred miles farther south, traverses the same belt of rocks, and exhibits them in forms not less picturesque. Castle Cañon, on the South Fork of the Price, is the equivalent of Echo Cañon, and its equal or superior in every thing except color. The brilliant red of the Echo cliffs is wanting. The towers and walls of Castle Cañon are yellowish-gray. But their forms are incomparably various and grotesque—in some instances sublime. The valley of Green River at this point is a cheerless sage-brush desert, as it is farther north. To be sure, this uninviting stream, a couple of hundred miles farther south, having united with the Grand, and formed the Rio Colorado, does indeed, by dint of burrowing deeper and deeper into the sunless chasms, become at last sublime. But here it gives no hint of its future somber glory. I remained awake till we had crossed Green River, to make sure that no striking scenery should be missed by sleep. But I got nothing for my pains except the moonlight on the muddy water; and next time, I shall go to bed comfortably, proving to the conductor that I am a veteran and not a tender-foot.

In the morning, we breakfasted at Cimarron, having in the interval passed the foot-hills of the Roan Mountains, crossed the Grand, and ascended for some distance the Gunnison, a tributary of the Grand, the Uncompahgre, a tributary of the Gunnison, and finally a branch, flowing westward, of the Uncompahgre. A high divide at the head of the latter was laboriously surmounted; and then, one of our two engines shooting ahead and piloting us, we slid speedily down to Cimarron. It is in such descents that the unaccustomed traveler usually feels alarmed. But the experience of the Rio Grande Railroad people is, that derailment is likely to occur on up-grades, and almost never in going down.

From this point, comparison with the Union Pacific line in the matter of scenery ceases. As every body knows, that road crosses the Rocky Mountains proper in a pass so wide and of such gradual ascent that the high summits are quite out of sight. If it were not for the monument to the AMESES, there would be nothing to mark the highest point. For all the wonderful scenery on the Rio Grande road, between Cimarron and Pueblo, the Union Pacific in the same longitudes has nothing to show. From an artistic stand-point, one road has crossed the ranges at the most tame and uninteresting point that could be found, and the other at the most picturesque.

At Cimarron, the road again strikes the Gunnison, and plunges into the famous Black Cañon. In length, variety, and certain elements of beauty, such as forest-ravines and waterfalls, this cañon surpasses the Royal Gorge of the Arkansas. There is, however, one spot in the latter (I mean, of course, the point where the turbulent river fills the whole space between walls 2800 feet high, and the railroad is hung over it) which is superior in desolate, overwhelming grandeur to any thing on the Gunnison. Take them all in all, it is difficult to say which is the finer. I have usually found the opinion of travelers to favor the Gunnison Cañon. But why need the question be solved at all? This one matchless journey comprises them both; and he who was overwhelmed in the morning by the one, holds his breath in the afternoon before the mighty precipices of the other. To excuse myself from even hinting such folly as a comparison of scenery, I will merely remark that these two cañons are more capable of a comparison than different scenes usually are; for they belong to the same type—deep cuts in crystalline rocks.

Between them come the Marshall Pass (nearly 11,000 feet above sea-level) over the continental divide, and the Poncha Pass, over the Sangue di Cristo range. This range contains Harvard, Yale, Princeton, Elbert, Massive (the peak opposite Leadville), and other summits exceeding the altitude of 14,000 feet. To the east of it is the valley of the Arkansas, into which and down which we pass, and so through the Royal Gorge to Cañon City and Pueblo, where we arrive before dark on the day after leaving Salt Lake.

Salt Lake, the Jordan Valley, Utah Lake, the Wahsatch, Castle Cañon, the Black Cañon of the Gunnison, Marshall Pass, Poncha Pass, the Arkansas Valley, the Royal Gorge—what a catalogue for so brief a journey! No wonder every body who has made it is "wild about it." If enthusiastic urgency of recommendation from every passenger has any influence (and I know it has a great deal), this road will continue to be, as it is at present, crowded with tourists. It furnishes a delightful route for those who wish on the overland journey to see Denver (as who does not?) and to visit Colorado Springs and Manitou. All this can be done *en route*, without retracing the steps.

I ought to add that a minor but highly important and agreeable surprise of this trip was the safety and comfort of it. The road-bed is excellent, and laid with steel throughout. The Pullman narrow-gauge sleepers are pretty and comfortable. The officers and servants of the company are extraordinarily attentive—a case of new brooms, perhaps: if so, may they never grow old! And finally, the eating-stations and the meals served in them are better than those on the Union Pacific, and incomparably better than those on the Central Pacific. The Denver & Rio Grande managers have pursued an admirable policy in this particular. They have erected handsome buildings for their eating-stations, and let them rent free to caterers, on the sole condition of excellence in housekeeping, purveying, cooking, and service. Failure in this respect involves summary forfeiture of lease. And finally, they have appointed a competent inspector to have charge of this particular department.

These features of management, coupled with the unique natural attractions of the road, will make it really a dangerous rival to the Union Pacific, so far as through passenger travel is concerned, at least. Already, there are signs of a bitter competition—so far, very welcome signs indeed; for they consist in improvements on the old line. The self-content and indifference of the "monopoly" has been rudely dispelled. Time-tables are to be revised and abbreviated. Let us hope that dinner-tables will suffer some reform also. Perhaps the amelioration may be contagious, and spread even to the Central Pacific, which, being still a monopoly, would not wake up of itself. Perhaps Providence may also lend a helping hand. Perhaps, some happy day, the eating-house at Elko may be struck by lightning! But these are mere day-dreams! *

DENVER, June 21, 1883.

STEEL CASTINGS IN PLACE OF IRON AND STEEL FORGINGS.*

It is well known by those who have the management of steamships, and the responsibility of keeping them in efficient working order, that large forged stern frames and rudder frames, as now made, are seldom absolutely sound. Numbers of cases of these forgings having failed when put to work come under our notice, and afford sufficient evidence of the necessity of some improvement being made; while the mortality of wrought-iron crank-shafts belonging to the mercantile marine of this country is excessive. Now, if these parts of steamships and marine engines can be cast sound, solid, thoroughly homogeneous, and free from internal strain, and at the same time possessing the requisite strength and ductility, it will be a great advantage for engineers and ship-builders, and eventually also for ship-owners, to adopt this material for these purposes.

At present, however, the subject of solid steel castings of these forms is somewhat in its infancy, and it is but natural that much doubt and suspicion should be found to exist in the minds of many who for the first time approach the question, just as, some four or five years ago, great distrust was manifested in many quarters as to the reliability and suitability of mild steel for plates, angles, and rivets for shipbuilding and marine boiler-making. The hesitation in adopting the new material was doubtless strengthened by the many cases of mysterious fractures, and the instances of excessive corrosion brought forward to show the unwisdom of changing from iron to steel; but these doubts no longer exist, and the superiority of mild steel over iron for the principal structural parts of a ship is now freely acknowledged. In proof of this, I may mention that last year there were no less than 73 large steamships built of steel, with a tonnage of about 143,000; that 116 vessels, with a total tonnage of 216,784, were building of steel in January last; and that at the present time, there are more than six times as many marine boilers making in this country of mild steel as there are making of iron.

During the past twelve months, several applications have been made, by various firms, to the society which I have the honor of serving, for its approval of the use, in vessels classed by Lloyd's Register, of steel castings for such purposes as stems, stern-frames, rudders, tiller-quadrants, and other parts of vessels, and also for crank-shafts, levers, link-blocks, and other portions of marine engines, these parts having usually been made of wrought-iron. Before coming to any decision on the matter, the committee of Lloyd's Register decided to fully investigate, first, the physical properties of the material intended to be used, such as its strength to resist various kinds of strain, its ductility, the homogeneity and soundness of casting of such forms as were desired to be used, and also as to whether the processes by which these castings were made and the raw materials employed were such as would be reasonably expected to secure certainty as to the results obtained; and finally, to consider what tests it would be practicable to use to determine the quality of the material after the castings have been made. With this object in view, visits were made to the three firms in this country who proposed making these large steel castings, and the views were elicited of those gentlemen who have had practical experience with these castings, as well as those who have been actively engaged in heavy forgings for shaftings and complicated parts of machinery. Subsequently, also, visits were made to the works of, and consultations held with, the principal steel-makers in France, a country where, up to the present time, much greater attention has been bestowed upon such matters than in our own. Tests were also made, not only upon samples of the material cut out of castings, but also upon castings themselves, and similar tests were conducted upon samples of forged iron and forged steel. The result is, that structures can be made of cast-steel quite as fit for the purpose intended as those usually constructed of wrought-iron, and that they can, at the same time, be made in such a manner as to avoid the uncertainty inevitably associated with large iron forgings, owing to the large number of weldings necessitated in them.

Although there is no doubt that very successful steel castings have been made by each of the three makers referred to as being engaged in this trade, namely, Messrs. Jessop & Sons, of Sheffield, Messrs. Spencer & Sons, of Newburn-on-Tyne, and the Steel Company of Scotland, of Glasgow, it is strange that such diverse opinions and practices prevail at these works, and perhaps equally strange that such opposite opinions are held upon the question of large forgings, both in iron and steel, experience of which has been obtained from the practice of many years.

At the works of Messrs. Jessop, for instance, the opinion is held, and

* Abstract of a paper read by Mr. William Parker, of Lloyd's Register of Shipping, before the British Iron and Steel Institute.

the practice is in accordance with this opinion, that, in order to insure a definite composition of the material with the precision which is necessary, and to obtain thorough homogeneity throughout a large casting, it is absolutely necessary to melt the steel in crucibles. The material put into each crucible having a definite composition, it is claimed that the resulting fluid steel remains of identically the same composition; while the opinion is held that, if steel is melted in large masses in a Siemens furnace, although the resulting metal may be sufficiently homogeneous for plate purposes, it is not sufficiently so for many structures where absolute homogeneity and freedom from internal molecular strains are required in every part. At the other works, on the contrary, the opinion is held that homogeneity may be obtained in metal melted in Siemens furnaces. Messrs. Spencer & Sons use both crucibles and open-hearth furnaces to melt their steel, the size of the castings being their only guide in this matter, and they find absolutely no difference as to the material, whichever process is used; while the Steel Company of Scotland uses the open-hearth furnaces for every purpose. Messrs. Jessop and Messrs. Spencer both seem to hold the opinion that the requisite composition of the resulting steel, to insure not only strength and ductility, but also solidity and soundness, can be obtained by careful attention to the materials employed. At the works of the Steel Company of Scotland, however, the process is essentially that known as the Terre-Noire. The metal is melted in an open-hearth Siemens furnace, a bath being formed of a mixture of manganiferous pig-iron and steel scrap by melting these materials together. Successive additions of hot steel scrap are then made, until the bath contains a sufficiently low amount of carbon to give the resulting product the hardness desired. There is then added an amount of an alloy called silicide of manganese, which insures the solidity of the steel and its freedom from blow-holes, the metal being finally tapped into a ladle, and run into molds in the usual manner. Throughout the operation, the greatest care is taken to prevent oxidation of the metal as far as possible. No ore is used, as the company, being a large maker of steel plates, always has available a large quantity of mild steel scrap of definite composition. The plan of using a compound of iron, manganese, and silicon, as is always done at these works in place of the older method of using glazed iron—which is iron and silicon without any manganese—is held to be preferable for the following reason: When glazed iron—or iron and silicon—alone is used, a portion of the silicon is oxidized by the small amount of oxygen which the metal has taken up, forming a silicate which is very difficult of fusion even at a steel-melting heat; consequently, a certain amount of slag is left intimately mixed with the iron, and metal thus made is composed of particles of metal separated from each other by a very thin coating or film of slag. This renders the resulting metal very "short" and brittle, and no amount of subsequent annealing completely rectifies it. On the other hand, when an alloy of silicon, iron, and manganese is used, a compound slag is formed, into the composition of which the manganese enters; this is very fusible at a steel-melting heat, and rapidly rises to the surface of the metal, leaving the metal itself perfectly free from slag.

Whichever process is used for obtaining the molten steel, great difficulties have to be overcome in successfully making castings of any but the simplest forms. The high temperature required in order to give the metal sufficient fluidity necessarily causes the castings to have a large contraction, which not only is a great cause of "piping," since steel castings can not be "fed" like other castings, but, in order to prevent fracture of the casting while in the mold, great judgment is required in making the mold sufficiently fragile to yield under the contraction strain, and at the same time to give it a sufficiently rigid surface, and make it sufficiently strong to withstand the wash and pressure of the metal while it is fluid. The temperature, too, is so high that it is difficult to find a material suitable for facing the molds, refractory enough to withstand the temperature, and at the same time avoiding chemical action on the metal used. When the casting is satisfactorily obtained, great differences of opinion are held as to the necessity for or the utility of annealing. At Messrs. Jessop's, the opinion is held that the careful cooling of the original casting, so as to insure a uniform cooling throughout, is the only means of insuring molecular equilibrium and freedom from internal strain, and that any subsequent heating must necessarily be far from uniform, the outer and thinner portions being first heated, and that this want of uniformity of temperature produces molecular strains in the material, which subsequent cooling, however carefully performed, can not entirely remove. All other steel-makers, however, consider that the cooling which takes place in the mold can not be so uniformly performed as to leave the casting free from molecular strains; while even if this could be done, the rigidity of the mold itself must necessarily create some molecular strains, and they consider that the only way in which these strains can be set at rest is by careful annealing. The annealing process here meant is not a decarburizing one, no chemical change being produced in the material; but it consists of slowly and uniformly raising the temperature of the casting to a bright-red heat, keeping it at that temperature for a length of time, dependent upon the form and dimensions of the casting, and then slowly and uniformly cooling it.

M. Pourcel, of Terre-Noire, attaches great importance, not only to annealing, but also to tempering castings in oil, in order to give them a greater degree of ductility. He contends that the metal in castings, especially those of a complex character with abrupt terminations and changes of form cast in a sand mold, can not be of a uniform nature. In castings comprising various degrees of thickness, the thin sections of metal must cool more rapidly than the thick ones; and besides setting up strains, this varying rate of cooling causes a difference of crystallization in the various parts, and that to such an extent that uniform crystallization and molecular equilibrium in such castings can not be entirely obtained by merely annealing, which is effectual for this purpose in ordinary plain castings. Tempering, or in other words, cooling the castings in oil is, however, very beneficial. The first application entirely transforms the large crystalline grain of the metal into a finer and more homogeneous grain, while each successive repetition still further adds to its homogeneity, tenacity, and ductility. As an illustration of this, I had four specimens cut from a casting made at Terre-Noire, and tested under my own supervision. The first specimen, in the same condition as when cut from the casting, broke with a tensile stress of 32·07 tons per square inch and an elongation of 16 per cent in a length of 5 inches; the next specimen, which was annealed, broke at a stress of 33·7 tons per square inch with an elongation of 17 per cent; the third specimen was annealed and tempered in oil, and broke at a stress of 38·6 tons per square inch, having an elongation of 17 per cent; and the fourth specimen, which was twice tempered in oil, broke with a stress of 41·1 tons per square inch, with an elongation of 15 per cent. The specimens can be seen on the table, and on examination of the fractures it will be observed that the structure of the material is very much closer and finer after each annealing and tempering.

It must be remembered that the molecular strains induced through irregular cooling are not peculiar to steel; they occur in all castings; and although in brass and gun-metal castings the ductility of the metal is sufficiently great in comparison with the contraction in cooling to warrant these strains being practically ignored, yet in cast-iron the want of ductility is such that complicated castings are probably never made without being "drawn," while it is absolutely impossible to cast many forms in iron; and even with all the ingenuity obtained from long experience, it is not by any means uncommon for large cylinders and other marine engine castings to be actually fractured in parts before being taken out of the mold. Even in forgings, these strains are sufficiently severe to cause actual rupture in cooling; for instance, the cavities or so-called flaws often found in the center of large couplings forged with shafts are due to the fact that the outer portion of the coupling first cools and becomes comparatively unyielding; and in the subsequent cooling, the contraction of the inner portion being prevented from taking place radially by the strong cold outer portion, draws the metal asunder at or near the center.

THE CONSUMPTION OF CHEMICALS BY THE ALIZARINE INDUSTRY.

There is a strong movement on foot in England to manufacture the alizarine required by the dyers and calico-printers of England and Scotland. Mr. Joan Levinstein, in a paper before the Society of Chemical Industry, estimates the consumption of all countries at about 9000 tons per annum. For the production of 9000 tons of artificial 20 per cent alizarine, there are required somewhere about 3000 tons of from 55 to 60 per cent anthracene; from 3000 to 4000 tons of bichromate of potash (in this estimate there is no allowance made for the regeneration of the chromates); 18,800 tons of rectified sulphuric acid, or correspondingly less when muriatic acid is used for precipitating the alizarine; from 2000 to 3000 tons of from 45 to 50 per cent anhydrous fuming sulphuric acid; 10,000 tons of 70 per cent white caustic soda (this includes the necessary quantity of carbonate); and from 450 to 500 tons of chlorate of potash.

PEROXIDE OF HYDROGEN AND ITS INDUSTRIAL APPLICATION.

Oxygenated water, a common name for peroxide of hydrogen, has attracted within the last few years a good deal of attention, and it has been successfully employed for several useful purposes, such as the bleaching of tussah silks, the bleaching of ostrich feathers, etc., and is recommended for other applications. However, until some time ago, there was always a difficulty in getting the product in sufficient quantity and at such a price and strength that it could be used on an industrial scale. This difficulty seems to have been now removed, or rather to be on the point of being removed, by the attention which is paid by several manufacturers to the preparation of this useful product. It is stated that Mr. P. Ebell, of Pfungstadt, near Darmstadt, has succeeded in preparing economically a product pure, stable, and of constant strength, and capable of being easily transported to long distances, and to be kept for years without losing its bleaching properties. If, however, the temperature does not go above 30° C., it is kept in a dark place. Among other applications of this product, that of the decoloration of animal fibers is the most important, as it does not contain some of the disadvantages of other bleaching agents. For wool and silk, it is advisable, before bleaching, to cleanse the materials thoroughly, so as to eliminate all the greasy substances and impurities. For this purpose, Mr. Ebell recommends a bath in a solution of five parts carbonate of ammonia to 100 of water, this bath being followed by a soaping and thorough washing with water. The bleaching itself is performed either by immersing the materials in the solution of oxygenated water, and left there at a temperature of from 20° to 30° C., until the decoloration is complete, or the materials are impregnated, when they were wrung out and exposed in a room heated to about 20° C., where they are left to dry. In order to insure an even bleaching, it is well to agitate the materials by means of a mechanical arrangement. Hair is bleached by immersion in oxygenated water for a couple of days, the material having been previously cleansed by means of five per cent carbonate of ammonia and well washed with water. For bleaching ostrich feathers, almost the only decolorizing agent used nowadays is the peroxide of hydrogen. The feathers are cleaned first in a bath at 20° C., with from two to three per cent of carbonate of ammonia, for about twelve hours, by moving from time to time; they are then removed and washed, first with tepid soap-water, and afterward rinsed with fresh water. The bleaching bath of hydrogen peroxide is rendered slightly alkaline, and the feathers are immersed for two days, then rinsed with water, which must not contain any lime, and then dried at the ordinary temperature by a current of air, otherwise with still air the feathers would take a horny feeling and appearance. Ivory, bone, and wax can also be bleached by means of the peroxide of hydrogen. While Germany is starting the manufacture of this bleaching agent on a fairly large scale, English chemists do not remain idle in this field, and, in fact, attempts are now making in the English alkali district to produce on a very extended scale not the hydrogen peroxide but a product capable of giving the same results, namely, calcium peroxide. Mr. Ludwig Mond has taken out patents for commercially producing calcium peroxide. He proposes to first produce peroxide of barium, which is decomposed under pressure by means of carbonic acid and water into barium carbonate and hydrogen peroxide. The carbonate of barium thus formed, after separation from the liquor, is used again for the production of the peroxide of hydrogen, while, by adding milk of lime to the liquor, hydrated peroxide of calcium is precipitated, and forms the commercial product. This material, if brought on the market at a low price, will no doubt find many very useful and extended applications in the industrial arts, and especially for bleaching purposes.

BESSEMERIZING COPPER MATTE.

The following letter, addressed by Dr. Percy to Dr. Raymond, has been delayed in publication by the absence of the latter in the West:

TO THE EDITOR:

SIR: In the last number of the ENGINEERING AND MINING JOURNAL which I have received (dated May 5th, 1883), I have read the correspondence concerning what is termed "Bessemerizing Copper Matte." In the first letter, it is stated that the first attempts were made in Russia in 1867. I send you by this post the specification of a patent for this process granted in 1856 to my old friend, Mr. Keates, one of our most experienced copper-smelters. It is remarkable how much seems either to be forgotten or ignored by some modern inventors.

I remain, very truly yours, JOHN PERCY.

HOUSE OF COMMONS, LONDON, May 18, 1883.

The patent of William Keates, of Liverpool, to which Dr. John Percy, the distinguished metallurgist, refers, is dated September 4th, 1856; and the invention is described substantially as follows:

The ore or other cupriferous material is first smelted to a regulus, and then introduced into a special furnace, in which, during or after fusion, currents of air, artificially heated if desired, are either forced at high pressure through the molten mass, or directed upon its surface.

The apparatus shown in the appended drawings is a reverberatory furnace, with four tuyeres at the corners, and two doors (besides the door of the fire-chamber), one at the end opposite the fire, for the withdrawal of slags, and the other on one side for charging. On the other side, not exactly opposite the charging-door, is the tap-hole, through which the coarse copper is run out into sand-beds. The patentee, with the usual comprehensiveness of his class, claims any other form of furnace or means of introducing the desulphurizing currents of air. On the details of the process, the following information only is vouchsafed:

"The general *modus operandi* is as follows, but may be varied to suit the convenience of special circumstances: The regulus or matte being introduced into the furnace in any of the usual modes, the apertures are closed and the fire urged until the regulus has nearly attained the fusing-point; the blast is then turned on and the heat of the furnace increased to effect a perfect fusion while subject to the operation of the blast. This process is continued (occasionally removing the slag or scoria formed during the operation) until the whole of the copper becomes metallic, when it is tapped out of the furnace into sand or other molds prepared for its reception. If found more convenient for the purposes of the smelting-works or manufactory, the contents of the furnace may be tapped out when only partially desulphurized, and again submitted to this process, or refined in the usual manner."

As to the tuyeres, Mr. Keates declares that he uses, where iron would not stand, fire-clay or "composition," either in cylindrical tubes, or square or octagonal blocks traversed by a cylindrical cavity, the latter being glazed, and the tubes or blocks joined with socket-joints and luted with fine fire-clay. These are built into the walls and under the sole of the furnace, thus forming an integral part of the structure. *

A REPLY TO MR. C. A. STETEFELDT.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: My old friend, Mr. C. A. Stetefeldt, of New York City, has seen fit to criticise, in the issue of this paper of June 16th, 1883, a report of mine, made some time ago, to the owners of the Mount Cory mine in Nevada. He does not limit himself to professional criticism, as he properly should, but indulges in personalities. He charges that I never built or ran a Stetefeldt furnace, and consequently, in his opinion, I do not know what a Stetefeldt furnace is, nor what it can do. My answer to this charge is, that Mr. Stetefeldt is forgetful of the fact, that at least one, and often several Stetefeldt furnaces have been in constant operation at one or more places on this coast for a long time; that they were open to inspection and study, if indeed any study were required to understand his furnace; that its results are matters of record; that various publications discuss the Stetefeldt furnace; and that last, but not least, Mr. Stetefeldt himself has done all he could, true to the nature of a patentee, to disseminate knowledge of the Stetefeldt furnace and what it can do, throughout this country at least, both by pamphlets and verbal discussions. I suppose this disposes of Mr. Stetefeldt's charge as to my ignorance of a Stetefeldt furnace. I will add, however, as a parting conclusion, that if an extensive experience in running the furnace is required in order to understand it, then the furnace is less recommendable than I supposed it was, and Mr. Stetefeldt himself can not be the best Stetefeldt furnace man.

In the same ungenerous mood, he charges me with limited experience in amalgamation, because I have had charge of a tailings mill in Dayton, Nevada. Generally, amalgamation consists in a few simple operations, and when it ceases to be that, when the "chemicals," from bluestone down to snuff, fail to produce satisfactory results, the ore is pronounced to be of a refractory character. If there were any particular difficulty in amalgamation to be overcome, and hence more skill were required in one case than in another, naturally the tailings amalgamator, so much despised by Mr. Stetefeldt, would be the more skillful amalgamator; for if successful, he extracts that which the ore amalgamator could not take out. Now, if raw amalgamation, to which I have referred so far, is not much of a trick, amalgamation of roasted ore is still less so, for obvious reasons. The tailings mill I did run at Dayton was a success; it treated 300 tons of tailings per day, and its owner grew rich on it. Besides all this, amalgamating mills have been numerous for a long time on this coast; they were always open to inspection, and their results matters of record.

Mr. Stetefeldt charges me with having formulated general laws for metallurgists to be guided by in the future. This is not so, although, I must say, it is never too late for any one to learn. Whatever I did say in that report was simply intended for a private party, and was said of a particular kind of ore.

Mr. Stetefeldt seems to be ignorant of various facts concerning this report of mine, and labors under a misconception of what I say in it. To enlighten him, if I can, I beg to submit the following statement and reports, to wit:

Some time ago, I was employed to determine the most feasible plan for working Mount Cory ore. This ore consists of quartz as gangue, the silver-bearing minerals being galena, zinc-blende, native silver, fahlore, copper and iron sulphides; the gangue in the ore amounting to from 85 to 95 per cent. Crushing and chloridizing, roasting, with subsequent amalgamation or leaching, were what I determined would be the most favorable for working the ore. Stamps have heretofore been almost the universal means for crushing under similar circumstances, roasting and amalgamation the subsequent treatment. Since there were opportunities to practically test the ore by either stamps or Krom rolls, the Stetefeldt furnace or cylinder furnaces, amalgamation or leaching, we availed ourselves of these opportunities. In all cases, the tests were not made under my supervision alone, but also under the supervision of the respective superintendents and foremen of the mills, all gentlemen whom I have the pleasure of knowing as efficient officers, and all of whom have the experience so highly valued for once by Mr. Stetefeldt. When the test was made in the Northern Belle mill, I was not even present. Mr. Belding, who conducted the test, has, however, all the experience Mr. Stetefeldt possibly can desire him to have. The test in the Geddes & Bertrand mill was conducted in the presence of Mr. Eckart, the mechanical engineer of the Mount Cory mill, the superintendent and foreman of the mill, and myself. Below will be found the results as obtained in each mill. My conclusions were drawn from these results, and I should be pleased to know what kind of a plant Mr. Stetefeldt would have recommended if he had been in my position. The ore used for the tests was practically of the same kind and character. It is true, Mr. Belding has used only one ton of Mount Cory ore to make his test with, although I had recommended to treat ten tons at least; yet Mr. Belding has such extensive experience with the Stetefeldt furnace and pan-work that, considering Mr. Stetefeldt's valuation of experience, he will hardly find fault with Mr. Belding's proceeding. The reports speak for themselves and are as follows:

STAMPS, STETEFELDT FURNACE, AND AMALGAMATION.

OFFICE OF NORTHERN BELLE MILL AND MINING CO.,
BELLEVILLE, NEV., March 21, 1883.

A. G. MCKENZIE, *Sup't Mount Cory Mining Co.:*

DEAR SIR: Two thousand and eighty pounds of your second-class ore were received in due time, crushed, roasted, and amalgamated, with the following results:

The crushing was at the rate of 44 tons per twenty-four hours, with 20 stamps of 1000 pounds each, dropping 8 inches, 96 times per minute.

The value per ton was $43.79. Loss in roasting, 5 per cent of weight, and 9 per cent of value. Loss in tailings, 14 per cent of value, making a total loss (after deducting 19 per cent—estimated mechanical loss between furnace and tailings) of 24 per cent in value, or a yield of 76 per cent. Fractions have been omitted in my calculations.

This I consider good work for the grade and character of the ore. More experience would, without doubt, improve this materially.

I am satisfied that the Stetefeldt furnace will handle such ore successfully, while the cost of reduction ought not to exceed $10 per ton, with wood at $5 per cord and salt at $20 per ton.

The fineness of bullion from this test will be forwarded by next mail; the amalgam appears to be of fair grade. Yours truly,

WILLIAM F. BELDING.

BELLEVILLE, NEVADA, March 22, 1883.

A. G. MCKENZIE, *Sup't Mount Cory Mining Co., Hawthorne, Nevada:*

DEAR SIR: The fineness of bullion produced from your ore is 736, the base being copper. Yours truly, WILLIAM F. BELDING.

WORKING TEST AT BERTRAND MILL.

G. R. WELLS: SAN FRANCISCO, April 27, 1883.

DEAR SIR: Below please find results of the recent working of three charges of Mount Cory ore at the Bertrand mill, Geddes, Nev., and my opinion, to wit:

ROLLS.

Lot 1.—18,200 pounds—$9\frac{1}{10}$ tons of Mount Cory ore—and 1820 pounds of salt were crushed by a crusher and two sets of rolls through a No. 20 screen, in 4 hours and 17 minutes. The resulting pulp was a rather coarse material, but it roasted pretty well, as was subsequently ascertained. Thus the crushing capacity for Mount Cory ore of said mill is nearly 50 tons of ore and 5 tons of salt per twenty-four hours, all crushed through a No. 20 screen.

Lot 2.—7201 pounds of Mount Cory ore and 1080 pounds of salt were crushed by the same machinery through a No. 30 screen, in 3 hours 52 minutes. Thus the crushing capacity of said mill for Mount Cory ore and 15 per cent salt, for the time being, and crushing through a No. 30 screen, was at the rate of $22\frac{1}{2}$ tons of ore and $2\frac{1}{2}$ tons of salt.

The machinery consisted of one crusher, two pairs of rolls, elevator, screens, etc. The crusher and first pair of rolls (roughing rolls) were out of order, being in a worn-out condition; the second pair of rolls (finishing rolls) were in first-class condition, having been provided with new steel rings only three weeks ago. Under the circumstances, said finishing rolls had to do most of the work, I should say about two thirds of it, while the crusher and roughing rolls together, perhaps, performed one third. Taking this assumption for a fact, one pair of rolls will crush say 15 tons through a No. 30 screen in twenty-four hours, or two sets 30 tons, three sets 45 tons, etc. The latter pulp (crushed through a 30 screen) was still much coarser than a dry stamp battery will crush through a like screen, owing to the different manner of screening the pulp in each case compared with the other.

If, then, a certain number of stamps crush nearly 45 tons of Mount Cory ore through a No. 30 screen, as was done at the Northern Belle mill said number of stamps do more than three sets of rolls would; that is to say, said number of stamps would be preferable to three pairs of rolls when fine pulp is required, and *vice versa* when not. For roasting in a Stetefeldt furnace and subsequent amalgamation, or amalgamation in any case, finely-divided pulp is required, while for purposes of leaching, a coarse material is just as good, and even preferable, for which reasons stamps, Stetefeldt furnaces, and amalgamating pans should go together, and rolls, cylindrical roasting-furnaces, and leaching tubs also.

ROASTING-FURNACES.

The roasting-furnaces, four in number, are of what is called the Brückner style, simplified. They have a capacity of about $12\frac{1}{2}$ tons of Mount

Cory ore, will need about 5 per cent of salt, using 2½ cords of nut-pine wood each. That is to say, the four furnaces can roast about 50 tons in twenty-four hours with 10 cords of wood, requiring the attention of 8 men in 12-hour shifts in the twenty-four hours. There are three roasters on each shift, 6 per twenty-four hours, and 2 dustmen during the day shift. A Stetefeldt furnace of the same capacity these four furnaces possess will use about 5 cords of wood, 5 per cent salt, and 3 men in 8-hour shifts in the twenty-four hours, the Stetefeldt furnace not requiring any power to drive it except his elevator and screen, which is very little compared with the power to drive these four furnaces, each of which requires from 4 to 6 horse-power all the time. All these facts speak in favor of the Stetefeldt furnace. But, at the same time, the Stetefeldt furnace requires finely-divided pulp, and to obtain it stamps are necessary, which stamps are certainly more expensive in every way than rolls, and, after roasting such fine pulp, amalgamation must follow, which again is in every respect more expensive than leaching.

LIXIVIATION.

There are 24 leaching-tubs at the Bertrand mill, and since Mount Cory ore will leach in about forty-eight hours in charges of from 4½ to 5½ tons, said mill could leach about 50 tons in twenty-four hours. We leached three different charges of Mount Cory ore. The first was finished in 60 hours, the second in 40 hours, the third in 48 hours. The tailings showed respectively 3·63 ounces, 4·80 ounces, and 2·62 ounces per ton. I can hardly believe that amalgamation will give lower tailings, nor that the Stetefeldt furnace will lose less silver in roasting. A comparison with Mr. Belding's reports will show the differences between lixiviation and amalgamation tailings, and the same will be shown by the four sacks of roasted Mount Cory ore shipped, from the second and third charges of these trials.

Should there be no difference in tailings from amalgamation and lixiviation, then the latter is preferable to the former, because a lixiviation plant is cheaper than an amalgamation plant, and the cost of operating them is in favor of lixiviation also.

ROASTING AND LIXIVIATION RESULTS IN FIGURES.

Charge I.—Ore from all the tunnels excepting "E."

Weight of charge	10,131	pounds	@ 38·64 ounces per ton =	195·71	ounces.
Less flue-dust	340	"	@ 19·53 " " =	3·32	"
Net charge	9,790	"	@ 39·30 " " =	192·39	"
Ten per cent salt	1,077	"			
Net ore	8,713	"	@ 44·10 "	$57 per ton in silver.	
Weight of roasted charge	8,970	"	@ 39·50 "	per ton = 177·15 ounces.	
Weight of tub tailings (91 per cent and 9 per cent)	8,162	"	@ 3·63 " " =	14·81	"
Therefore, leached out or obtained in sulphides, that is, bullion				162·34	"

We therefore have:

Bullion	162·34	ounces =	84·3 per cent.
Loss in roasting	15·24	" =	7·9 "
" tailings	14·81	" =	7·8 "
	192·39	" =	100·00 "

Not considering the loss in roasting, part of which no doubt, is flue-dust, remaining in the dust-chambers; and beginning with the roasted charge, as many mills do, we have:

8970 pounds charge @ 39·50 per ton	177·15	ounces.
Loss in tailings	14·81	"
Obtained in bullion (sulphides)	162·34	"

Which is equal to having obtained 91·6 per cent in bullion, and loss 8·4 per cent in tailings.

Charge II.—Ore from all tunnels except "E."

Weight of charge	9,890	pounds	@ 46·66* =	230·73	ounces.
Less flue-dust	125	"	@ 34·11 =	2·11	"
Net charge	9,765	"		228·62	"
Less 10 per cent salt	868	"			
Net ore	8,897	"	@ 51·3 or $66.31 per ton.		
Weight of roasted charge	8,966	"	@ 41·65 =	186·71	ounces.
Sacked for amalgamation	240	"	@ 41·65 =	5·00	"
Net weight of charge worked	8,526	"		181·71	"
Tub tailings (91 per cent and 9 per cent)	7,758	"	@ 4·80 =	18·61	"
Obtained in sulphides (bullion)				163·10	"
Obtained in bullion				73·3	per cent.
Apparent loss in roasting				18·4	"
Loss in tailings				8·3	"
				100·00	per cent.

Or, if the roasted ore alone is taken to start with, we have 89·7 per cent bullion obtained, and 10·3 per cent lost in tailings.

Charge III.—Ore of tunnels C and D only. It was treated more carefully than the former two charges, and is therefore a fairer test to show what can be done by lixiviation, etc., with Mount Cory ore.

Weight of Charge III	8,282	pounds	@ 30·67 ounces =	126·80	ounces.
Added flue-dust I	340	"	@ 19·53 " =	3·32	"
" " II	125	"	@ 34·11 " =	2·11	"
Total charge	8,747	"		132·23	"
Less 15 per cent salt	1,081	"			
Less flue-dust	32	"		0·42	"
Net ore	7,634	"	@ 34·7 ounces =	132·81	"
Weight of roasted charge	8,411	"	@ 30·03 " =	126·27	"
Sacked for amalgamation	242	"	@ 30 03 " =	3·63	"
Net charge worked	8,169	"		122·64	"
Tub tailings (88 per cent and 12 per cent)	7,188	"	@ 2·62 ounces =	9·41	"
Sulphides obtained (bullion)				113·23	"
Obtained in bullion				87·7	per cent.
Loss in roasting				5·0	"
" tailings				7·3	"
				100·00	per cent.

Or, if we start with the roasted ore, we have obtained 92 per cent in bullion, and lost 8 per cent in the tailings.

* This roll sample is unreliable, owing to a mistake having been made in sampling, which, when discovered, could not be rectified any more.

RECOMMENDATIONS FOR MOUNT CORY PLANT.

Taking these results, as a whole, I would recommend rolls, cylindrical furnaces, and leaching as against stamps, Stetefeldt furnaces, and amalgamation. A Stetefeldt furnace, as stated before, will work cheaper than a cylindrical furnace, and either cheaper than all the rest of known furnaces; but rolling ore and leaching it is cheaper than stamping and amalgamating it. The running cost in either case, I think, will be alike, but the cost of the plant with rolls, cylindrical furnaces, and leaching vats is cheaper than stamps, Stetefeldt furnace, and pans.

Respectfully yours, ALBERT ARENTS.

Mr. Stetefeldt says in his article, at about the 40th line from the beginning: "So far, the conclusions of Mr. Arents have my earnest support. When, however, he proceeds to wipe the Stetefeldt furnace out of existence with a stroke of his pen, it is," etc. What an unnecessary scare he allowed himself to get into! I do not wish to rob the Stetefeldt furnace of its merits, as any body may plainly see who reads my report with an unprejudiced eye, nor the Stetefeldt Company of its income by way of royalties. I have always considered the Stetefeldt furnace a valuable apparatus for purposes of chloridizing, from the record it has made; but I know of no case where said furnace has treated ores so coarse as not to pass a forty screen. Now, I desire to roast the Mount Cory ore in a much coarser state than that just mentioned, and do not feel inclined to build a Stetefeldt furnace for that purpose, because I am not sure but I might find, in starting up, that coarsely-crushed ore, ore that was crushed through a 16 or 20 screen, would fall so quickly through the shaft of the Stetefeldt furnace that it might reach the bottom before all its sulphur even is oxidized. I do not mean to say that the Stetefeldt furnace can not roast such material; but I do mean to say that I can not afford to experiment in this direction for the benefit of the Stetefeldt Company, when said company does not pay the expenses. Let Mr. Stetefeldt demonstrate by actual current work that this furnace does roast much coarser material than it heretofore has been roasting, and I shall be the first person to advocate its use for the purpose.

Mr. Stetefeldt's "analysis" of a small portion of my report, which he calls "the two rules of Mr. Arents," is any thing but just and sensible, because he interprets the portion first to suit his own purpose and then attempts to refute his own interpretation. This part of his article deserves no answer; yet, to gratify his desire for a reply, I will answer it. He makes four divisions:

1. He attempts to prove that Krom steel rolls will produce very finely-divided material up to dust. As far as the latter material is concerned, I bear testimony myself that Krom's rolls produce plenty of dust; for I never was in as dusty a place, the cooling-floor of the Stetefeldt furnace in the Northern Belle mill excepted, as the Bertrand mill roll-room is. That would be a sufficient proof, I suppose, for Mr. Stetefeldt to know that Krom's steel rolls produce pulp of any desired fineness for practical purposes, but it is not for me. On closer inspection and inquiries, I found that Krom's steel rolls, excellent as they are in every respect in comparison with all other rolls, which in course of time came under my observation, suffer from the same evil other rolls suffer from, namely, from uneven wear on the surface of the rolls. The consequence is, that the rolls, after a certain time, become grooved, like all other rolls. They may be turned off, as a matter of course; but during the time from one turning off to another, grooves of more or less extent will exist, which will prevent the rolls of proper capacity from practically and economically crushing ore to such fineness as is required for amalgamation or as dry crushing batteries usually produce. Of course, when I say this, I have two, or at most three, sets of rolls in view. I am, however, of opinion, that by increasing the number of sets of rolls, and forcing each set to crush all ore to a certain given and uniform size by providing each set with a screen of its own, the screens decreasing in size of mesh up to the finishing rolls, Krom's rolls will economically crush to any desired fineness; for at all events, the grooves in any set of rolls can never be as deep as the largest sized pieces of rock fed to it are in diameter. Each succeeding set of rolls will thus receive finer material for renewed crushing than its preceding set received, and each set receiving uniform material at all times, the grooves on each succeeding set will therefore be less deep. We have it thus in our power, in spite of the evil mentioned, to make Krom's rolls, or in fact any rolls arranged in the manner indicated, crush to any desired fineness without turning off. But a large number of sets of Krom's rolls, as required for such an arrangement, have a tremendous capacity, and are very expensive and therefore undesirable for the Mount Cory mill. I find by experiments that two or three sets of rolls crushing through a 20 or 30 Krom screen will do better than stamps; but beyond that fineness, stamps are preferable, according to Mr. Belding's results.

2. I wish to state that, when I speak of finely-divided pulp, I mean such pulp as is generally used in amalgamation and in Stetefeldt furnaces; that is, pulp crushed through a 30 or 40 screen. Just such finely-divided pulp as I state in my report is necessary for amalgamation, Mr. Stetefeldt himself bears testimony to. Such pulp is necessary on account of settler work, as he correctly states. Very well, what does Mr. Stetefeldt want? Is settler work not a part of the process of amalgamation, of which I speak in my report?

3. I wish to state that the chief silver-bearing mineral in the Mount Cory ore is its galena, a galena highly argentiferous. When that is roasted and chloridized, each particle of galena becomes practically a small mass of sulphate of lead, intimately mixed with chloride of silver. Both substances probably form a fused or semi-fused mass, hard to dissolve. At any rate, it is an established fact that the leaching of Mount Cory ore is a slow process in comparison with leaching in other localities. Leaching ore is dissolving solid material in an aqueous medium, and I take it to be an established principle, learned by experience in thousands of cases, that the dissolving of any thing does not practically take place unless motion between the dissolvent and the substance to be dissolved takes place; and furthermore, that the more vigorous the motion is, the more energetic is the dissolution. Now, if this is so, it follows that the liquor intended to dissolve the silver should pass very freely indeed through the mass of roasted ore. A speedy and copious percolation of the liquor, weak as it may be, should take place, in which conclusion I am supported by practical experience. I have furthermore experimented in my laboratory with Mount Cory ore in regard to leaching, and found that, the finer the ore was, the slower was the filtering and

the extraction thereby of both silver and lead. When I say, then, in my report, that, "after roasting such fine pulp, amalgamation must follow," it is plain that I mean that, although leaching finely-crushed pulp is possible, it is at the same time inexpedient, at least with Mount Cory ore, and that then amalgamation is preferable.

Had I written a scientific dissertation on the subject instead of a simple report, I should have made the above explanations and perhaps a good many more; but in a report to parties who are simply interested to know, as I understand them, how to turn their ore to the most profitable account, theoretical explanations are out of place. Such explanations, under such circumstances, may accord with Mr. Stetefeldt's methods, but not with mine.

4. Mr. Stetefeldt treats of his greatest grievance, to wit: I don't believe that a Stetefeldt furnace can roast ore coarsely crushed. I have already mentioned this point above; but I will say once more here, how glad I shall be to learn that the Stetefeldt furnace can accomplish this feat. But before I shall be sure of its ability to do it, I wish to have it demonstrated in an unmistakable manner. Mr. Russell's experiments in this direction are interesting; but I was till now not aware of them, and I wish to see them first verified by current work.

Now as to the economical question, the only one of practical interest. I will state that the cost of treating a ton of ore is at the Bertrand mill thirty per cent cheaper than at the Northern Belle mill, although the latter mill is crowded to its utmost capacity, and treats more ore, and effectively treats it, than any other mill of its size I know of. It is true, labor and wood are dearer at the Northern Belle mill than at the Bertrand mill; but both are of better quality too at the Northern Belle mill. Yet I have been very liberal to the side where the Stetefeldt furnace works; for I have called cost of treatment of Mount Cory ore even in each case; and when I recommend the treatment of Mount Cory ore by rolls, cylindrical furnaces, and leaching, I do it only on the score of cheaper plant. Respectfully yours, ALBERT ARENTS.

ALAMEDA, CAL., June 26.

THE WORKING OF STRONTIAN IN SICILY.

The recent introduction of strontian into the manufacture of tuyeres has given considerable importance to this mineral, which is comparatively scarce. Besides the deposits in Westphalia, those of Sicily are rather extensive, as to the working of which the *Chemiker-Zeitung* gives the following details: "The *celestine*, or sulphate of strontian, is found at Favara, near Girgenti, in the strata of the lower Miocene rocks, which in Sicily generally contain sulphur. These strata consist of limestone, calcareous marl, and gypsum, in the midst of which the sulphur is disseminated, generally in the form of fine powder, and more rarely in nodules the size of a pea or nut. At Favara, sulphur is not present to any great extent, but is partly replaced by sulphate of strontian. The upper strata of the rocks, which are mainly horizontal, are decomposed by the action of the air; the light mineral particles are carried along by water, while the *celestine*, which is heavier, and therefore less liable to be carried away, remains in blocks on the surface. In appearance, it differs but little from the limestone with which it is associated; but it is easily distinguished by its greater specific gravity (3·9), on account of which it has received the local name of *cuchiommo*, from *come piombo* (like lead). The ore is at present only worked open-cast at Favara, no regular mine workings having yet been attempted. The inhabitants of the region lead it down to the railroad stations at Girgenti or Palermo, where it is bought by merchants at 35 lire (28s.) a ton. At Porto Empedode, it is screened, to free it from the gangue, and then shipped for Hamburg and other ports. In 1880, only 1000 tons were exported; but in 1881, the production increased to 4000 tons. Works are now going up at Rosslau, in Alsatia, for the conversion of the Sicilian ore into caustic strontian and carbonate of strontian, this latter (strontianite) not being found in Sicily."

LOADS AND STRAINS ON HOISTING ROPES.

Mr. W. Silver Hall, of Derby, England, writing to the *Engineer*, gives the following interesting facts, and makes suggestions which in many instances American engineers would do well to follow:

Some years since, I had a winding rope broken about three feet above the cap, in the act of raising the loaded cage from the props; in fact, the cage was raised, and fell about two and a half feet, as nearly as could be estimated. The weight of cage, tub, coal, and chains, with the cap and piece of broken rope, would be 75 or 76 cwt.; the weight of rope suspended in the shaft, 32 cwt.; total, 108 cwt. The rope was a flat one, of iron wire, tapering from 4¾ inches to 4¼ inches wide, giving a breaking strain of 60 tons and 50 tons, and a safe working load of 136 cwt. and 112 cwt. at the upper and lower ends respectively. It had only been in use a few weeks, and there was no sign of any flaw at the point of rupture. After the torn end was cut off, and the rope re-capped, it continued to do its work satisfactorily for the full average life of the ropes at that pit. The engine, although a single-cylinder one, was remarkably easy to handle, and the engine-man one of the steadiest and most skillful that I have known. The rate of winding, though smart, was not excessive, the run of 202 yards being made in 30 seconds, and the three-decked cage changed in 30 seconds; or, allowing for occasional delays, say 55 runs per hour.

At first sight, the rope might have been expected to break at the top end, where the actual weight to be lifted was nearly 80 per cent of the theoretical safe working load, rather than at the bottom end, where the weight was only 68 per cent of the theoretical safe load; but when it is remembered that the 32 cwt. of rope is already in rapid ascending motion before the "snatch" comes to start the 76 cwt. of cage, etc., into motion, it is apparent not only that the rope actually did break where the severest strain came upon it, but also that that strain is very much nearer to the actual breaking strain than is commonly supposed.

A mere record of facts, such as the above, is not of much value unless it leads to the suggestion of some improvement in the appliances, or in the method of using them, calculated to obviate similar accidents in the future. One such suggestion, and the most obvious, is the substitution steel for iron ropes, giving, with a rope of the same weight, an increased strength of some 50 per cent; but of course at a considerably increased cost. To employ a stronger and, consequently, heavier iron rope, would have the effect of striking an up-hand blow with a heavier hammer than before. Again, it is doubtful whether, for pits of moderate depth, the advantages obtained by a tapered rope are not purchased too dearly by the weakness at the bottom end, where, as we have already seen, the greatest strain comes at the moment of starting. Now, where the suspended weight of rope is counterbalanced by a tail rope—which, as I pointed out at the Leeds meeting of the Institution of Mechanical Engineers, in August last, can probably be economically applied in cases where the depth does not exceed 500 yards or thereabouts—the weight on the rope is constant at any stage of the winding and, consequently, a parallel rope is the right thing.

But perhaps the most important point of all is to diminish, as far as possible, the dead-weight snatched at by the rapid starting of the engine, and this can only be done by using the lightest possible trams and cages. In the instance above given, if the cage had been of steel, instead of iron, its weight might probably have been reduced 30 per cent or more—and I could point out instances where a much greater reduction has actually been effected—thereby reducing the total weight to be snatched at, that is, coal, tubs, cage, and chains, by about 12 per cent. But while cages are only too often considered as a convenient stock job, on which the colliery smith may advantageously employ the olds and ends of his time, and expend such bars of iron as he happens to have no other use for; while they are too often commenced, continued, and finished without any harmonious design or plan, but by the addition of one part after another, each fulfilling its own object, and adding to the total weight, but not contributing to the aggregate strength of the structure; while some of the parts most severely strained are too often weakened by injudiciously placed bolt or rivet-holes, and when they fail are replaced by stouter bars and bigger rivets, the result can scarcely be satisfactory in any respect, and least of all where lightness is desired. Perhaps the next attempt is made in steel, with a result more disappointing than ever, and that ill-used material, as I have too often found when advocating its use, is for ever discredited in the eye of the disgusted proprietor.

As there is no difficulty in making a properly designed steel cage which for any given weight of coal to be lifted shall be from 25 to 50 per cent lighter, and shall cost no more than an iron one, it is surely time that the state of things which I have endeavored to describe, and which, as every mining inspector knows, is only too common, should cease to exist.

GLASS-BLOWING BY COMPRESSED AIR.

Engineering describes a process for dispensing with mouth-blowing in glass manufacture, which has been in use at the Clichy Glass-Works of MM. Appert, in Paris, since 1879. The first in France to employ compressed air for glass-blowing was probably an *ouvrier* named Baccarat, who, in 1824, invented a small mechanical blower. Appert's apparatus is capable of blowing the largest pieces of glass; and it is extremely valuable from a humane point of view, as it prevents those maladies of the glass-blower which arise from forced expiration, and breathing hot dry air. The apparatus, as described to the French Academy of Sciences, consists of two conjugate compressors put in action by the shafting of the works, and storing compressed air in reservoirs sufficient to serve twelve hours. It is distributed to the blowing apparatus by pipes with cocks, and controlled by a pressure regulator. In the Clichy works, the air is employed under three pressures—one of 42 pounds per square inch, one of 14 pounds per square inch, and one of 2·85 pounds per square inch. The last pressure serves for the construction of goblets, jugs, etc., lighting-lamps, bottles, and so on. The air is supplied to the glass by giving it an axial rotation similar to that of the blow-pipe. The latter is fitted with a stop-cock by which the workman can regulate the air supply. The glass is rotated either on horizontal or vertical axes, to suit the class of work. As the preacquired habits of the workmen have been consulted in this new apparatus, they readily become used to it. The new machines enable the manufacturers to dispense with a number of the children formerly employed in this injurious work.

PHOSPHORUS IN NICKEL.—Pure nickel, after melting and casting, generally holds a greater or less quantity of oxygen in combination, and the metal is brittle. To hinder the injurious effects of the oxygen, it is necessary to incorporate in the melted nickel some substance which has a strong affinity for oxygen, and also for the nickel itself. According to the *Comptes Rendus*, M. J. Garnier finds that phosphorus serves both of these purposes very satisfactorily, producing effects analogous to those of carbon in iron. If the phosphorus does not exceed three tenths of one per cent, the nickel is soft and very malleable; above this quantity, the hardness increases at the expense of the malleability. Phosphorized nickel, when alloyed with copper, zinc, or iron, gives results which are far superior to those that are obtained from the same nickel when not phosphorized. By means of the phosphorus, Garnier has been able to alloy nickel and iron in all proportions, and always to obtain soft and malleable products. The contradictions of illustrious chemists are thus explained, some saying that such alloys were brittle, others that they were malleable. The latter had alloyed the nickel to phosphorized iron.

THE TRANSPORTATION OF EXPLOSIVES.—In commenting editorially on the report of the British Inspectors of Explosives, the *Ironmonger* says: In respect to the packing and conveyance of explosives, a curious case is cited in support of the contention that packages containing dynamite must be thoroughly water-proof. This was a case in which a cart containing dynamite of foreign make, while conveyed across the Duddom Sands from Millom to Dalton, stuck fast in a quicksand, and the water caused the nitro-glycerine to exude to such an extent that the dynamite had to be blown up on the sands. The inspectors, again, condemn the "false policy" of the railroad companies in refusing to carry various explosives under any conditions, as leading to surreptitious conveyance of the prohibited articles, and they cite an example in which 300 pounds of blasting gelatine were conveyed by a passenger from Newcastle to London by passenger train, then across London by cab, and again by rail to Whitstable. This "handy little earthquake," it may be remarked, was conveyed, for the most part, in a second-class smoking-carriage!

FURNACE, MILL, AND FACTORY.

The following is a partial list of the awards for the best displays at the Chicago Exhibition: Logging and mining locomotive, gold medal, H. K. Porter. Locomotive involving important new principles, gold medal, Philadelphia & Reading Railroad Company. Steam gauge, silver medal, Ashcroft Manufacturing Company. Wire cloth, bronze medal, Clinton Wire Cloth Company. Boiler rivets, bronze medal, Hoopes & Townsend. Locomotive steel forgings, gold medal, Midvale Steel Company. Locomotive and car iron forgings, silver medal, Wilson, Walker & Co. Pressure gauge, silver medal, Yale & Towne Manufacturing Company. Coal, ore, or gravel dump-car, silver medal, U. S. Car Company. Steel axle (master car-builders' standard) silver medal, Midvale Steel Company. Iron axle (master car-builders' standard), silver medal, Pittsburg Forge and Iron Company. Spring (elliptic), gold medal, A. French & Co. Springs (bearing), silver medal, A. French & Co. Springs (buffer or draw), bronze medal, French Spiral Spring Company. Steel tire for car wheels, gold medal, Midvale Steel Company. Steel tire combination wheel, gold medal, Allen Paper Car Wheel Company. Iron working tools (power), not less than six in number, grand gold medal, Pratt & Whitney Manufacturing Company. Axle-turning machinery, silver medal, Machine Tool-Works. Car-wheel boring and turning-machine, gold medal, Machine Tool-Works. Six-spindle drilling-machine, silver medal, Niles Tool-Works. Hydraulic wheel press, silver medal, Machine Tool-Works. Wheel-grinding or trueing machine, silver medal, Chilled Car-Wheel Grinding Company. Iron planing-machine, silver medal, Machine Tool-Works. Iron crank-shaping machine, silver medal, Pratt & Whitney Manufacturing Company. Screw-cutting engine lathe, silver medal, William Sellers & Co. Upright drilling-machine, silver medal, William Sellers & Co. Radial drilling-machine, silver medal, Machine Tool-Works. Bolt-heading machine, silver medal, National Machinery Company. Bolt forging machine, silver medal, National Machinery Company. Bolt and screw cutting machine, silver medal, National Machinery Company. Set-screw machine, silver medal, Pratt & Whitney Manufacturing Company. Power hammer, silver medal, Machine Tool-Works. Power punch and shears, silver medal, Hercules Iron-Works. Planer chuck, silver medal, Pratt & Whitney Manufacturing Company. Universal and independent chuck, over twelve inches in diameter, silver medal, E. Horton & Son. Universal lathe chuck, twelve inches and under, silver medal, E. Horton & Son. Assortment of lathe chucks, silver medal, E. Horton & Son. Assortment of planer chucks, silver medal, E. Horton & Son. Display of emery grinding machinery, silver medal, Northampton Emery Wheel Company. Display of machinist's vises, silver medal, Fisher & Norris. Display of taps and dies, silver medal, Pratt & Whitney Manufacturing Company. Nut-tapping machine, silver medal, Shumway, Burgess & Co. Drill-grinding machine, silver medal, William Sellers & Co. Slotting machine, silver medal, Machine Tool-Works. Driving-wheel lathe, gold medal, William Sellers & Co. Shafting, gold medal, Jones & Laughlins. Hanger, bronze medal, Jones & Laughlins. Pulley, bronze medal, Jones & Laughlins. Flue welding device, bronze medal, Hartz & Fix. Portable power drill, bronze medal, Thomas H. Dallet & Co. Spring tester, silver medal, Tinius Olson & Co. Display of tools for repairing locomotives, silver medal, Flanders Machine-Works. Hot-air pumping-engine, silver medal, C. H. Delamater & Co. Machine for testing strength of metals, gold medal, Fairbanks, Morse & Co. Vertical boring-mill, silver medal, William Sellers & Co. Horizontal boring-machine, silver medal, William Sellers & Co. Steel and iron rails and track goods, grand gold medal, Cambria Iron Company, Track bolt and nut, bronze medal, Hoopes & Townsend. Track bolt-washer, bronze medal, Pratt Manufacturing Company. Car-wheel iron, gold medal, Barnum, Richardson & Co. Flanging iron, silver medal, Eureka Iron Company. Boiler plate (iron), silver medal, Eureka Iron Company. Display iron ores, gold medal, Barnum, Richardson & Co. Steam-pump for water station, gold medal, Fairbanks, Morse & Co. Hand pump for water station, bronze medal, Fairbanks, Morse & Co. Hydraulic ram, bronze medal, J. B. Clow & Son. Track scale, gold medal, Fairbanks, Morse & Co. Platform scale, silver medal, Fairbanks, Morse & Co. Rubber belting, silver medal, Hamilton Rubber Company. Surveyor's transit, silver medal, W. Jordan & Son. Surveyor's field glass, bronze medal, L. Manasse. Display of surveyor's instruments, gold medal, Keuffel & Esser. Variety of engineer's drawing tools, bronze medal, L. Manasse. Engineer's level, bronze medal, W. Jordan & Son. Engineer's barometer, bronze medal, L. Manasse. Set of engineer's railroad curves, bronze medal, Keuffel & Esser. Leveling rod, bronze medal, Keuffel & Esser. Prismatic compass, bronze medal, L. Manasse. Tube welding machine, bronze medal, Manning, Maxwell & Moore. Cupola, silver medal, Colliau Furnace Company. Malleable iron castings, bronze medal, Cleveland Malleable Iron Company. Fire-clay brick, bronze medal, Denver Fire-Brick Company. Power blower, silver medal, Boston Blower Company. Power pressure blower, silver medal, Wilbraham Brothers. Portable forge, bronze medal, Buffalo Forge Company. Hand blower, bronze medal, Buffalo Forge Company. Cold-pressed nut, silver medal, Hoopes & Townsend. Display of nuts, bolts, rivets, etc., gold medal, Hoopes & Townsend. Copper boiler and flues, silver medal, American Tube-Works. Seamless copper pipe, silver medal, American Tube-Works. Seamless brass pipe, silver medal, American Tube-Works. Elevator buckets, bronze medal, B. F. Gump. Rawhide belting, silver medal, Chicago Rawhide Manufacturing Company. Cotton belting, silver medal, Gandy Belting Company. Boiler and pipe covering, silver medal, Shields & Brown. Hot pressed nut, silver medal, J. H. Sternburgh.

The Wetherill Steel Casting Company has been organized at Chester, Pa., with $500,000 capital stock, and will build steel-works in that town.

An iron draw is about to be shipped from Paterson, N. J., to the Northern Pacific Railroad for a bridge over the Snake River, Oregon, which is said to be the longest and heaviest double-track draw ever built, being 345 feet long and weighing 450 tons. Another, to span the Willamette River, Oregon, is to be 390 feet long and made mostly of steel. The cost of this will be in the neighborhood of $90,000.

The business of the Jarvis Furnace Company and the New England agencies of the Korting injector, Armington & Sims Company engines, Sheffield grate-bars and Schuttee & Goehring's jet instruments, will in the future be conducted by a stock company organized under the State laws of Massachusetts, with a capital of $100,000. This company will do business under the name and style of the Jarvis Engineering Company. It will not only take charge of the old agencies, but it will do a general engineering and contracting business in putting in steam plants for all kinds of manufacturing purposes. Mr. K. M. Jarvis, of Boston, will be president; A. F. Upton, of Boston, treasurer and general manager. The directors will be K. M. Jarvis, A. F. Upton, L. B. Wright, Boston, Mass.; H. A. Glasier, Springfield, Mass.; F. H. Pond, St. Louis, Mo.; and J. A. Grant, secretary and clerk.

Broad & Ewer, Progressive Iron-Works, are getting well established in their new shops, Nos. 251 to 255 Greenpoint avenue, Brooklyn, N. Y. They are at present building six of the Parson & Northey grinders and amalgamators for precious ores, each of which is to be complete, with steam-engine for driving. This company also manufactures the Van Dyke water-tube boiler.

At Worcester, Messrs. C. Stewart & Son are making and have orders for steel boilers from more than a dozen different places in and out of New England. They use the "Nashua" brand of steel, made at Nashua, N. H., which is stamped 60,000 pounds tensile strain, and equal to the best.

The Russell Hardware Company, with Charles T. Russell as president and $150,000 capital, is going into business at Higganum, Conn. It will employ from 50 to 75 men, and controls a number of valuable patents.

The cylinder-head of one of the large engines at Graff, Bennett & Co.'s Millvale mill blew out last week.

The large sewing-machine factory at Downingtown, Chester County, Pa., has been bought by Philadelphia parties, and is to be converted into extensive stove-works.

The Helmbacher Forge and Rolling-Mills Company, of St. Louis, has added another hammer to its works, which makes its plant now six hammers. It has also put in a new 75-ton testing-machine.

Messrs. Osgood & Co. are building some new spelter furnaces at their Bergen Port works.

GENERAL MINING NEWS.

ARIZONA.

GRAHAM COUNTY.

A discovery of galena ore was recently made in a claim half a mile south of the Detroit copper mines. The croppings are well defined and can be traced for a long distance. The formation is lime. A shaft was sunk on the vein six feet in depth, an assay of the ore going 40 ounces silver. The vein, which is narrow on top, promises to widen as depth is attained.

At a point about thirty miles from Clifton, between Eagle Creek and Blue River, a party has located a number of claims, the ore from which is sulphurets, and carries gold that can be seen with the naked eye. After making these locations, the party journeyed eastward, and prospected the range bordering the Blue to the westward. Here they made four locations, the samples of the ore brought in being sulphurets and yellow chlorides. The formation is quartzite an porphyry.

CALIFORNIA.

MONO COUNTY—BODIE DISTRICT.

The reports from the leading mines of this district show no important change. The usual amount of development-work has been done, and the production remains as usual.

PLUMAS COUNTY—GREENVILLE DISTRICT.

GOLD STRIPE.—During the past week or more, ore-hauling to the mill has been steadily going on. The dump is now pretty well filled up, and the mill will probably be started up in a few days.

SIERRA COUNTY.

MARGUERITE.—The mine is steadily improving.

RAINBOW.—It is stated that this property has been sold. The company intends to begin the work of running a new tunnel this season. This tunnel will be run from Kanaka Creek, and will tap the ledge in 2500 feet. Burleigh drills will be used, and the work will be pushed ahead as rapidly as possible.

SIERRA BUTTES.—A force of men is engaged in excavating for the foundation of the new mill to be erected on the river by this company.

CANADA.

PROVINCE OF NOVA SCOTIA.

A dispatch from Halifax says that a cablegram from London announcing the formal decision of the Judicial Committee of the Privy Council sustaining the appeal of C. F. Mott and others in relation to the Salmon River gold mines was received July 2d by the appellants.

CENTRAL AMERICA.

NEW YORK & HONDURAS-ROSARIO.—The official reports from the mines of this company continue very favorable. All the headings in the Rosario mine are said to be in good ore. East of the main shaft, between the fourth and fifth levels, the superintendent reports ready for extraction a solid body of ore 75 feet long and 100 feet deep (the vein averaging 3 feet thick), estimated to contain about 2000 tons of rich ore. The New York still shows the bonanza ore previously reported. The explored body is now 300 feet long, and the ore is of uniform grade. The headings of the two cross-cuts are in good ore, though not so rich as that of the main body. The tunnel intended to connect the New York and American mines will be completed in a short time and will facilitate considerably the extraction of ore from these two mines. The Matraca and Encinos are in the same body of rich ore, but none of the ore has been extracted for want of room on the dumping-grounds. After serious and unexpected delays, the new mill is running. The pans save eighty per cent of the bullion. Bullion valued at $1800, the result of a few broken days' run, has been received in this city, and more bullion is expected by the company per next steamer.

COLORADO.

CLEAR CREEK COUNTY.

GOLD LEAF.—This property was first discovered over a year ago, and was purchased by the present owners, who traced the lode by open cuts from three to six feet in depth and from twenty to thirty feet in length on the surface. The ore prospected so well in panning that several tons were sent to various points to be treated by both smelting and free milling. The proceeds of the ore paid nearly the entire expense. There are now a number of drifts, and an incline shaft on the vein to a depth of 90 feet, and it is still driven ahead. This incline is started near the apex of the hill. About 150 feet below, another drift is running, which will strike the incline at a depth of 150 feet. A stamp-mill, with grinding-pans and settlers to work the ore, is now in course of erection at the mine. The machinery is upon the ground, the frame of the mill is up, and the workmen are inclosing it as fast as possible. Fine ore was gathered from three different places on the vein, which panned out surprisingly rich. The mill is expected to be in readiness by the middle of July. But one battery will be put in at present, and extensions made as the property may demand. This property consists of three claims, being 4500 feet in length by 150 feet in width. The ore is a decomposed quartz, with a heavy seam of iron stain and rust, in places fully five feet in thickness. Only development-work has been done, yet there are hundreds of tons on the surface awaiting the completion of the mill.

MOLINE.—The tramway is completed. It is 2500 feet long, and has twenty-two stations. At each end is a horizontal wheel, around which the endless cable passes. Fifty buckets are attached at intervals of 100 feet. Each carries from 100 to 150 pounds. An entire revolution is made in less than forty minutes, so that two and a half tons are moved at each revolution. Forty tons can be easily trammed in ten hours, and this can be increased by adding buckets up to the sixteen-ton capacity of the cable. The whole affair has been invented and built in the past three months.

MONTREAL.—In order to work the property more successfully in the future, it was considered advisable to work it through a tunnel or adit on the vein, which has been run 300 feet and gained a depth of 150 feet. The mineral showing is well, and a shaft is sinking.

PERKINS TUNNEL.—The recent rich gold strike has been sold for $10,000. Development-work will be started immediately.

GUNNISON COUNTY.

BULLION KING.—A company has been organized, with a capital of $150,000, 15,000 shares, at $10 per share. Machinery has been ordered, and as soon as it is ready, work will be begun to sink the incline shaft one hundred feet deeper.

FOREST QUEEN.—A contract has been entered into with the Rose & Reed Milling Company, by which the latter takes all the ore produced.

LAKE COUNTY.

Late Leadville exchanges contain the following:

ADLAIDE.—The lessees have opened up a large body of ore. The parties are working the mine through No. 2 shaft. The mine at present shows a ten foot

face of ore, and, with increased hoisting capacity at the No. 2 shaft, the lessees should be able to make an output of twenty or thirty tons of ore a day. The mineral is stated to be of very fair grade, and will net the company a good profit.

ALLEGHANY CONSOLIDATED.—The southern portion of this property has been leased to Messrs. Sanderson & Abbott, of Denver, for one year. The lease embraces the Right Angle and Rarus shafts. Machinery has already been ordered, and work will begin at once.

BROOKLAND.—Shipments have been resumed.

COLONEL SELLERS.—Shipments are very light at present, and will continue so probably until the litigation is ended. The new body of carbonates recently found is showing up well.

IRON HAT.—The lessees are meeting with good success. During the past month, they shipped about 250 tons of ore, while their property now shows fair resources. The lessees sunk a new shaft on this mine, which adjoins the Iron mine, when the lease was awarded them, and at twenty-eight feet encountered the contact. Pursuing exploration-work, mineral of paying quality was soon after encountered, and regular shipments followed. A second shaft has since been sunk to a depth of fifty feet, and drifting begun.

LA PLATA.—For the past year, this mine, the property of the La Plata Mining and Smelting Company, has averaged a daily production of thirty tons, including Sundays, and at present the property is turning out about fifty tons a day. The product of the mine is of fair quality, and particularly desirable as a smelting ore on account of the large percentage of lead and iron that it carries. The most extensive resources of the mine are large bodies of ore situated in the limestone. Very fine ore-faces are also presented in the extreme southern portion of the property, where developments are on a lime roll, and there are prospects of opening a large chute of ore within a short distance.

LITTLE ELLEN HILL.—A large amount of work is doing on the mines of Little Ellen Hill, and scarcely a shaft can be found in this section that is not working. Considerable ore is also taken out, and at all times of the day ore teams can be seen on the road between the mines of the hill and the smelters in Big Evans and California gulches. The mineral resources of Little Ellen Hill are fully as extensive as those of any other section of the Leadville District, and it is only due to the low grade of the ores, which prevented their profitable shipment until within the past year, that the mines are not as extensively worked as those of Carbonate or Iron Hill. Now, however, all of the properties are working large forces, and extensive ore-shipments are made which return very fair net profits. Among the most prominent are the Little Ellen, owned by the American Mining and Smelting Company, the Opulent, and the Virginius mine.

RUBY.—Three fourths of this mine were recently sold for $60,000. The purchasers have organized a company, to be known as the Savannah Mining Company. Operations on the property are to be commenced at once.

PARK COUNTY.

The Fairplay Sampling Works, owned by the Van Dusen Brothers, having recently put in new and improved machinery, are running to their full capacity and giving universal satisfaction.

LONDON.—The new twenty-stamp mill has been running very successfully. The ore being mostly free-milling gold quartz, the pulp is run off over plates, which process is supposed to work well so far as the saving of gold is concerned, although no reliable tests have yet been made. The battery samples of the quartz run under the stamps returned $48 in gold and $12 in silver to the ton. At present, the tailings are run into tanks, but experiments are now going on, and as soon as a conclusion can be arrived at as to the proper concentrating machinery to be used, concentrators will be put up, and the silver and also the gold escaping over the plates will be saved in this process. The mill is a few miles below the mine, and is connected by a railroad. At the end of the track, an automatic tramway forms the connection between the railroad cars and the mine, thus avoiding any second handling of the ore from the time it leaves the stopes until it reaches the self-feeders in the mill. The mine contains about 4500 linear feet of drifts, winzes, and rises. About forty men are employed.

PITKIN COUNTY.

THORNBURG.—This company, recently organized, has purchased the Mineral Farm mine and several other properties in its vicinity. Work has already begun and about fifty men are employed.

SUMMIT COUNTY.

BELDEN.—The prospects of the mine are favorable; the production is increasing; and as soon as the tramway, which is going up from the mine to the railroad, is finished, shipments will regularly be made.

KEYSTONE BULLION.—The smelter has been doing well during the experimental work of the past four weeks. All the concentrating machinery is operating satisfactorily. The large amounts of concentrating ore in this district will find a market at Breckenridge until works are erected at the different mines.

RED PEAK MINING DISTRICT.

This district, opened about two years ago, is showing considerable activity, and the season begins with the promise of resulting in numerous valuable developments. The district embraces an area about thirty miles in circuit, including the North, Middle, and South Willow creeks, also Rock and Gore creeks. A large number of veins have been discovered, and on an average have been found to contain very high-grade ores. Developments up to the present time are limited. The pay-streaks in the veins are also small, but much is expected of future development-work. The principal mines are right on the naked peak. Among them are the following: Boss Tweed, Silver Vault, Defiance (continuation of the Silver Vault), Lost Boy, Anglo-Saxon, Highland Chief, Black Prince, Comet, Lady Godiva, Silver Mint, D. S. lode, Scarff lode, Ackermann, and Ruby Elva.

The Cañon lode, on the south slope of Red Peak, is a vein measuring from six inches to four feet of quartz, with chunks of native silver weighing from a quarter of an ounce to six ounces. One small seam carries oxide of iron with native silver in small grains and wire.

DAKOTA.

CALEDONIA.—The superintendent reports, June 17th: Ore produced, 985 tons. Gold bar shipped, $14.500. The winze has advanced 8 feet, making a total of 140 feet (100 feet vertical). We have begun enlarging the bottom of the winze to put the pumps in place and are getting ready to start cross-cutting. The mine in general is looking well and the machinery at the mill is running excellently.

FATHER DE SMET.—The superintendent's report for the week ended June 22d shows: Ore extracted from first, second, and third levels, 1950 tons; ore milled, 1950 tons. Golden Gate north header in 146 feet.

RICHMOND.—The company is running three shifts on two drifts from the bottom of its shaft. One, the east drift, is in solid ore of a very fine grade. Twenty men are at work.

GEORGIA.

BARLOW.—During the past week, the Howland mill has been set up, and will soon be started for a trial run.

CHESTATEE.—Forty stamps are run by day and twenty on the night shift.

FISH TRAP.—Two veins have been opened during the past week, the specimens showing free gold. The mill is again running on full time.

GARNET.—The twenty-stamp mill now erecting on this company's property is almost completed. The building is of sufficient size to admit of the addition of another twenty stamps, which are to be added if developments warrant.

KEYSTONE.—According to the Dahlonega *Signal*, proceedings for foreclosure have been instituted; and in consequence, this property, which gives so much promise, must remain idle for an indefinite length of time.

LOUD.—A small force only is employed at this mine, and but little more than prospect-work is done.

IDAHO.

COLUMBIA & BEAVER.—The company's mill has started up on custom ore, of which there are several hundred tons at the Pilgrim, Columbia & Beaver, Silver King, and Bidwell mine-dumps. The mill men intend to charge $35 a ton for reduction, and will guarantee a yield of 90 per cent.

PHILADELPHIA MINING AND SMELTING COMPANY.—The additional buildings which have been in course of construction during the past six weeks at this company's works at Ketchum are nearly completed. They consist of two main buildings, the one 200 feet long by 50 wide, the other 60 by 60. Two new furnaces have been shipped. They will be blown in as soon as they are put in place. These, in addition to the two stacks already in operation, will give a smelting capacity of 180 tons per day.

MEXICO.

One of the greatest needs of Mexico at the present day, says the *Financier*, is the establishment of works in various parts of the country, upon an extensive scale and with the most approved modern appliances, for the reduction of the precious minerals. There is no better opening afforded to American capitalists for good investment, with large and absolutely certain returns, than by meeting this demand. It is said that during the past two or three years, over $10,000,000 of American money have been invested in mines in this country. Many large mines, of course, have their own reduction-works; but these are of little benefit to mining at large, since they are generally kept busy in reducing their own ores, and have not the capacity to accommodate custom-work.

The finest quality of white, mottled, and vari-colored marble is found in the great marble quarries near the city of Chihuahua.

BATOPILAS.—The company is putting up a new twenty-five-stamp mill and another roasting-furnace.

MAPIMI.—The experience of this company, in Northeastern Durango, with its new machinery, shows that modern facilities greatly increase the yield of the ore. With the old Mexican methods, the yield averaged $32 to the ton, but now the average is much greater. The new route of the Mexican Central Railroad will pass almost close to the mines.

NORTH MEXICAN MINING AND MILLING COMPANY.—This company has been organized to work the Hilo, Guadalupe, Ladero mines in Sonora. The ore carries chiefly silver. The mines are more or less developed. A stamp-mill and machinery are on the ground.

SANTA EULALIA.—Major Charles Hitchens has obtained the right to work over the slag. The company is pushing its development of the old mines vigorously. The new reduction-works near the railroad will be among the most complete in Mexico.

MICHIGAN.

The Marquette *Journal* gives the following table, which exhibits, in gross tons, the total lake shipments of iron ore from upper peninsular ports the present season up to and including June 27th, together with the amount shipped from the same ports during the corresponding period of last year:

Name of port.	1882.	1883.
Escanaba	525,748	362,723
Marquette	292,027	116,927
L'Anse	13,308	12,521
St. Ignace	7,499	.....
Total	838,582	492,171

Showing a decrease of 346,411 gross tons.

The hydraulic company which is now engaged to use the water-power at Little Quinnesec Falls, on the Menominee River, for driving the mining machinery of the Chapin and Ludington mines, about two miles distant, is hailed by local papers as a great enterprise.

ISHPEMING IRON COMPANY.—The company intends commencing work on its possessions in Marquette County in the near future. It possesses some valuable mineral-bearing tracts that will doubtless prove worth developing. A diamond drill will be employed in the search.

PENINSULA.—Machinery for exploratory work on the Pewabic lode is getting into place by this company, and sinking will soon be commenced. It is the intention to sink about 200 feet and thoroughly explore the main lode by drifting, as well as to determine the location, by cross-cutting, of branches or lateral deposits such as are found at the Quincy.

MINNESOTA.

MINNESOTA IRON COMPANY.—At the Breitung mine, one of this company's properties, about 3000 tons of ore have been mined and put in a stock-pile. This was taken out in the course of explorations made to determine the extent of the deposit. Considerable ore has been mined in the course of explorations made on other properties owned by this company, although no regular mining work has yet been attempted.

MISSOURI.

SUNNYSIDE.—This mine has been leased at a royalty of ten per cent. The lessee has sunk a shaft 35 feet deep, and the last 17 feet cut is a solid body of ore. A drift has been started from the bottom of a shaft, and the men are now cutting it. The water is light and easily managed. A lively excitement has sprung up already, and seven or eight shafts have been started down during the past week.

MONTANA.

GALLATIN COUNTY.

An important discovery of mineral has lately been made in the Emerson Mining District, just across the Jefferson River and about twenty-five miles west of Bozeman. The discovery can not properly be called a recent one, as a claim was staked off there thirteen years ago. But this spring, several miners went to prospecting the district, and the result is, some thirty locations have been made. The ore carries gold, silver, and copper, the latter predominating. Assays of the latter metal have given from 18 to 70 per cent, and as high as 240 ounces of silver have been received. The veins are about eight feet wide and have one well-defined wall, the other being somewhat broken and irregular. As there is not a twenty-foot shaft in the district, but little can be said.

HENRY VILLARD.—This company's property is opening up well. The gravel is 100 feet deep in some places.

SILVER BOW COUNTY.

PARROTT MINING AND SMELTING COMPANY.—At the annual meeting of the stockholders, held at Butte recently, the following directors were re-elected for the ensuing year: T. Hauser, A. M. Holter, and A. F. Migeon. Thomas Wallace was elected president; Franklin Farrell, managing director; and E. J. Gaylord, superintendent, secretary, and treasurer. A. F. Migeon, under whose superintendency the Parrott works were built and have since been operated, was, at his earnest solicitation, permitted to retire from the arduous duties of superintendent, a position which he is understood to have retained during the past year only under protest. The company starts on its new year in better shape than ever before, and will show good results before another election is held.

NEVADA.

The Peavine District, near Rome, at one time promised to be an important mining camp; but after a good deal of money had been expended, the place was abandoned. The *Gazette* says the ore is rich but rebellious.

DAY.—The lower levels of this mine have greatly improved during the

week. The large cave of ore recently struck has been sunk on to the depth of twenty feet.

ELKO CONSOLIDATED.—A twenty-foot ledge has been recently struck in the tunnel running in the ground lately purchased from the New York Company, but which has let it lie idle for years. The point at which the strike was made is 400 feet below the surface, and a considerable distance beyond the lead originally worked, which was left behind in the tunnel. The vein is 20 feet wide, of solid galena, and yielding from 45 to 49 per cent lead. It is estimated that at least 500 tons of such ore are now on the dump, and large quantities are in sight in the mine. In the mean time, a new and substantial furnace will be erected on the ground now occupied by the old one built by the Eastern Company years ago. It will be put in place immediately after the arrival of the necessary machinery, which is now on the way from the East.

LIMESTONE.—Work has just begun on this property at Bullion. There are 10 inches of high-grade galena and carbonate ore going straight down into the lime. The progress is eagerly watched. The Battle Mountain folks are talking of building a wagon-road to the Limestone Company's mines, in order to get shipments of ore for their new furnaces to run on.

MEADOW VALLEY.—A strike has been made in the old Fitzhugh tunnel. The ledge has been sunk on about six feet from the bottom of the tunnel, and is nearly four feet in width from wall to wall at the place where work was then going on. Some five tons of this ore were sent to the Dry Valley mill, and the pulp-assay went $44 in silver and $6 in gold, the total pulp-assay being $50. This discovery is nothing new. The workings of the mine show this. The ore above this point was all extracted years ago. The ore had all been extracted down to the tunnel level in early days, then becoming low grade, it was abandoned.

RUBY HILL TUNNEL.—The tunnel is in 304 feet, and a contract is about to be let to run 100 feet more. After passing through the iron seam 270 feet in, nothing else of a noteworthy character in the formation has been encountered. The ventilation continues to keep the air fresh and sweet.

SILVERADO.—The dump of ore belonging to this company, which came out of the property formerly known as the Rescue mine, has been leased. At the time the old company worked the mine, none but very high-grade ore was shipped.

UTAH.

SAMPSON.—Reports show that on the 20th of June ten tons of first-class ore netted at Park City $1100, and 20 tons of second-class ore netted $800. Work on the new shaft is advancing rapidly under the contract. Owing to the large quantity of surface water, work had been retarded, but now it is pushed forward. The shaft has reached a depth of 75 feet, and is sinking at the rate of about 3 feet daily. No more shipments of ore will be made until the shaft is down 200 feet, as the expense of extraction will then be much reduced.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

GRANTED JUNE 5TH, 1883.

278,685. Tuyere for Blast-Furnaces. John H. Cremer, Chicago, Ill.
278,731. Manufacture of Charcoal. Henry M. Pierce, Grand Rapids, Mich.
278,737. Utilizing the Phosphorus and Iron of Forge-Cinder. Jacob Reese, Pittsburg, Pa.
278,738. Method of Dephosphorizing Metal by the Bessemer Process. Jacob Reese, Assignor to the Bessemer Steel Company (Limited), Philadelphia, Pa.
278,801. Rock-Breaker. Bertram F. Kramer, Charleston, S. C.
278,813. Draught Regulator for Locomotive and other Furnaces. Horace W. Norwood, Philadelphia, Pa., Assignor to the Norwood Spark Preventive and Smoke-Consuming Company, Camden, N. J.
278,816. Method of Producing Golden Sulphuret of Antimony. Charles E. Parsons, Assignor to the Brunswick Antimony Company, New Brunswick, Can.
278,859. Ore-Roasting Furnace. William Black, South Shields, and Thomas Larkin, East Jarrow, County of Durham, England.
278,861. Apparatus for Amalgamating Ores. Elias Bollinger, Louisville, Md.
278,889. Method of and Apparatus for Heating the Gaseous Fuel of Furnaces. John H. Cremer, Chicago, Ill.
279,032. Hand Drilling-Machine. George W. Smith, Boston, Mass.
279,089. Lining for Iron and Steel Furnaces. Edward L. Ford, Lyons, N. Y.
279,099. Apparatus for the Continuous Distillation, Sublimation, or Roasting of Solid Materials. Fritz Lürmann, Osnabrück, Germany.

GRANTED JUNE 12TH.

279,122. Gold-Washer. Charles S. Betts and Harry E. Wilson, Salt Lake City, Utah.
279,146. Stone Breaking and Crushing Machine. Philetus W. Gates, Chicago, Ill.
279,147. Stone Breaker and Crusher. Philetus W. Gates, Chicago, Ill.
279,157. Compound for Furnace-Linings and Fire-Brick. James Henderson, Bellefonte, Pa.
369,164. Ore-Concentrating Apparatus. Charles B. Hitchcock, Indianapolis, Ind.
279,264. Coal and Ore Carrier and Transmitter. Frank Murgatroyd, Cleveland, O.
279,319. Amalgamator. Abel H. Bliss, Chicago, Ill., Assignor of one half to Sylvanus L. Tripp, same place.
279,331. Steam-Boiler Setting and Furnace. Thomas R. Butman, Cleveland, O.
279,473. Manufacture of Steel by the Open-Hearth Process. William A. O. Wuth, Pittsburg, Pa.
279,503. Miner's Lamp. Edward K. Rollins, Scranton, Pa.

GRANTED JUNE 19TH.

279,519. Turbine Water-Wheel. Cornelius Barnhart, Walker Valley, N. Y.
279,596. Process of Obtaining Purified Iron in the Bessemer Basic Process. Jacob Reese, Pittsburg, Pa.
279,640. Dry-Ore Separator. Miles B. Dodge, San Francisco, Cal.
279,641. Separator for Wet Ores. Miles B. Dodge, San Francisco, Cal.
279,652. Device for Turning Fly-Wheels of Engines, etc. Patrick P. Kilcullen, St. Louis, Mo.
279,666. Radiator for Furnaces. Dwight S. Richardson, Brooklyn, N. Y.
279,679. Pumping-Engine. James Waters, Minneapolis, Minn.
279,761. Coal-Crushing Roller. John H. Hosie and James P. Hosie, Scranton, Pa.
279,788. Coal and Ore Carrier and Transmitter. Frank Murgatroyd, Cleveland, O.
279,796. Process of Coking Coal-Dust for Manufacturing Fuel Gas. James W. Pittinos, Philadelphia, Pa.
279,834. Drilling-Machine. James C. Smith, The Dalles, Oregon.
279,840. Retorting Amalgam. Carl A. Stetefeldt, New York City.

GRANTED JUNE 26TH.

279,947. Process of Purifying Iron by Means of Fluorides and Condensing the Gaseous Products therefrom. James Henderson, New York City, Assignor, by mesne assignments, to Charles G. Francklyn, same place.
279,962. Mining Tool. Thomas A. Mayes, Philipsburg, Pa.
279,969. Coal-Burning Furnace. Arthur G. Moore, Winton Place, and John W. Rahn, Cincinnati O.
279,970. Chill for Metallurgic Furnaces. John Morrison, Pittsburg, Pa.
279,981. Turbine Water-Wheel. Joseph Raab, Dayton, O.
279,983. Ore-Crusher. William S. Sharpneck, Denver, Colo., Assignor of two thirds to H. N. Nichols, North Platte, Neb.
279,995. Amalgamator. Thomas Walker, Philadelphia, Pa.
280,001. Turbine. Abijah Woodward, Keene, N. H.
280,014. Coal-Elevator. Stephen V. Cook, Toledo, O.
289,027. Rotary Engine. Charles C. Garvelon and William A. Woods, Santa Cruz, Cal.
280,069. Amalgamator. Edward W. Nelson, Chicago, Ill., and Eugene H. Cowles, Cleveland, O.
280,093. Guide for Rolling-Mills. Alvan A. Simonds, Dayton, O.
280,102. Ore-Roasting Furnace. Thomas Walker and John F. Carter, Philadelphia, Pa., Assignors to said Walker.
280,133. Coal-Chute. Henry Claussen and Theodor Staeber, Ellinwood, Kan.
280,139. Tubing, Packing, and Operating Oil-Wells. Thomas L. Crowley, Rew, Pa.
280,158. Miner's Fuse. William Eltringham, Minersville, Pa.
280,248. Rolling-Mill. Thomas Shaffer, Phœnixville, Pa., Assignor to the Phœnix Iron Company, same place.
280,271. Brick-Drying Apparatus. Nathaniel S. Willet, Newark, N. J., Assignor to Minetta P. Cooper, same place.
280,284. Apparatus for Unloading Coal from Vessels. Walter S. Bogle, Chicago, Ill., Assignor of one half to Wendell R. King, same place.
280,310. Art of Manufacturing Iron and Steel. James Henderson, New York City, Assignor of one half to Charles G. Francklyn, same place.
280,316. Brick-Machine. Lewis B. Kennedy, Keokuk, Iowa.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, July 6.

The lack of interest attaching to the doings at the Mining Exchange has been aggravated this week by the absence of many who aid in framing the course of events there, and an unusually dull week has been added to the number of quiet ones which preceded it. The total number of mining shares sold at the Exchanges aggregates 69,815 shares, as against 138,740 shares last week.

There has been no news of any importance in regard to the Comstock mines, the prospecting-work at one or two particular points, from which so much is anticipated, not having as yet developed any thing, so far as the public is taken into confidence. California has dropped off further still, there having been sales as low as 10c. per share, while Consolidated Virginia has fluctuated between 35 and 45c. Sierra Nevada temporarily recovered to $4.15, but fell off again to $3.75, while Union sold at $4.75. Sutro Tunnel fairly held its own.

The Leadville stocks did not attract any special share of attention. It is stated, although we have been unable to confirm the report, that the Evening Star and Morning Star companies have again resumed dividends or propose to do so at an early date; $25,000 for each of them is the figure given. After eight months of suspension, this news will be received with interest, especially as it is understood to be the result of working a part of the large reserves of low-grade ore. Among the stocks dealt at the Exchange, Iron Silver holds its strong position at $2.90@$3, due to the confidence in the mine and its good business management. Amie and Chrysolite were quiet at their recent range, while there was little interest in Dunkin, Hibernia, Leadville, Little Chief, or Little Pittsburg. Climax has continued to gather strength, being carried up as high as 20c. on the 2d.

The Bodie stocks have been neglected almost completely.

Among the Tuscarora stocks, Navajo has again fallen back to $2.50, while all the rest have failed, in most instances, to record even a single sale.

In the miscellaneous list, Alice stands without a transaction. The mine is a steady producer, and should soon have wiped out its debt and have paid for improvements. Horn-Silver has fallen back a little, selling at $7. The outlook in the lead market, which, of course, largely affects the prosperity of this mine, is not considered good, and it is generally believed that a considerable stock of the metal is carried in Chicago. Green Mountain has been fairly active and steady. As yet, no decisive reports as to the developments in the tunnel have come to hand, though the time can not be far off when it must reach the Blake chute upon the continuance of which in depth the future of the mine chiefly depends. Robinson Consolidated has declined still further. Ontario has now safely passed through the spring deluge, and will soon obtain relief for its pumps by the completion of the tunnel. During the recent struggle with the water, the stock of ore at the mill was nearly exhausted. Sierra Grande has declined still further. Philadelphia is filled with sensational reports concerning the approaching exhaustion of this mine. The managers have made a very favorable contract with the Pueblo Smelting-Works for the working of the tailings, which were notoriously rich.

The daily newspapers are treated with protests from indignant stockholders of the Alta-Montana, and the errors of past managers are freely heaped upon the shoulders of the present officials. Professor Blake is understood to have made a somewhat rosy report on the mine. The trouble does not lie with the latter, but with the incapacity of those who put up the present plant, which can not handle the low-grade and refractory though cheaply mined ores. Nothing can save the company but a thorough remodeling of the metallurgical plant by one who understands his business. This will take considerable money.

Parnell seems to be going through the usual process of newly listed mines of being subjected to attacks.

DIVIDENDS.

The Evening Star Mining Company, of Colorado, has declared a dividend (No. 54) of $25,000 (as stated by Leadville papers).

The Morning Star Mining Company, of Colorado, has declared a dividend (No. 17) of twenty-five cents per share (as stated by Leadville papers).

The Rye Placer Mining Company, of Oregon, has declared a dividend of five per cent, payable July 16th.

The South Fork Gravel Mining Company, of California, has declared its first dividend.

The Standard Consolidated Mining Company, of California, has declared a dividend (No. 56) of twenty-five cents per share, payable July 12th.

PIPE LINE CERTIFICATES.

The activity which characterized the business at the petroleum exchanges at the close of last week, gave way to holiday dullness during the past few days of the present week, the market, however, showing more activity after the national holiday. Prices declined pretty uniformly and in the aggregate considerably. The monthly report, which is due on the tenth, is looked forward to with considerable interest.

The following table gives the quotations and sales at the New York Mining Stock and National Petroleum Exchange:

		Opening.	Highest.	Lowest.	Closing.	Sales.
June	30....	$1.18¼	$1.18½	$1.16¼	$1.16¾	2,944,000
July	2....	1.16¾	1.16¾	1.15	1.15½	1,758,000
	3....	1.14¾	1.15	1.14⅛	1.14⅝	1,546,000
	5....	1.14⅛	1.14¼	1.11⅜	1.12¾	4,812,000
	6....	1.13½	1.13½	1.11	1.12¼	1,504,000
Total sales.						12 564,000

SAN FRANCISCO MINING STOCK QUOTATIONS.
Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. June 29.	June 30.	July 2.	July 3.	July 4.	July 5.
Albion	.....	.....	.....	.....	.....	.....
Alpha	1¾	.....	.....	.....	.....	.....
Alta	.45	.40	.....	.....	.....	.45
Bechtel	.....	.....	.....	.....	.....	.....
Belcher	1⅛	1⅛	.....	.....	.....	.....
Belle Isle	.50	.50	.....	.....	.....	.45
Best & Belcher	4⅛	4⅛	.....	.....	.....	4⅜
Bodie	.85	.80	.....	.....	.....	.85
Bullion	.....	.....	.....	.....	.....	.....
California	.....	.15	.....	.....	.....	.15
Challar	3¼	3⅜	.....	.....	.....	3½
Con. Virginia	.45	.45	.....	.....	.....	.45
Crown Point	1¼	.....	.....	.....	.....	1⅜
Elko Cons	.25	.30	.....	.....	.....	.....
Eureka Cons	4⅛	5	.....	.....	.....	5¼
Exchequer	.25	.20	.....	.....	.....	.20
Gould & Curry	2½	2½	.....	.....	.....	2½
Grand Prize	.10	.10	.....	.....	.....	.05
Hale & Norcross	6	7	.....	.....	.....	6⅛
Independence	.70	.....	.....	.....	.....	.....
Martin White	5	.....	.....	.....	.....	.....
Mexican	2⅞	3	.....	.....	.....	3
Mono	.....	.....	.....	.....	.....	.....
Mount Diablo	.....	.....	.....	.....	.....	.....
Navajo	3⅛	2⅞	.....	.....	.....	2½
Northern Belle	6¾	6¾	.....	.....	.....	6⅝
North Belle Isle	.....	.....	.....	.....	.....	.20
Ophir	2⅝	2½	.....	.....	.....	2¾
Overman	.....	.....	.....	.....	.....	.....
Potosi	1⅜	1⅜	.....	.....	.....	1⅜
Savage	2	2⅛	.....	.....	.....	2
Scorpion	.....	.....	.....	.....	.....	.....
Sierra Nevada	3⅝	3¾	.....	.....	.....	3¾
Silver King	10	10	.....	.....	.....	10
Tip-Top	.....	.....	.....	.....	.....	.45
Union Cons	.....	.....	.....	.....	.....	4¾
Wales Cons	.....	.....	.....	.....	.....	.....
Yellow Jacket	3⅝	3⅞	.....	.....	.....	3⅞

BULLION MARKET.

NEW YORK, Friday Evening, July 6.

The market is a little better than it was at the date of our previous posting; but it is, nevertheless, without any indications of value as to its early future.

DATE.	London. Pence.	N. Y. Cents.	DATE.	London. Pence.	N. Y. Cents.
June 30	50 7-16	110¼	July 4	50½	Holiday.
July 2	50 7-16	110⅜	5	50½	110½
3	50 7-16	110⅜	6	50½	110½

Bullion Receipts at New York.—The bullion received from the mines at the various offices in this city during the week ended July 6th, as compiled from various sources, amounted to $158,000, as against $138,500 reported for the previous week. The receipts from January 1st, 1883, to date are $5,988,213.53.

Exports and Imports of Gold and Silver at New York.

Exports.

Week ended June 30th	$215,178
Corresponding week last year	1,647,797
Since January 1st, 1883	6,620,882
Corresponding period last year	35,941,234

Imports.

Week ended June 30th	$48,492
Corresponding week last year	31,847
Since January 1st, 1883	6,940,957
Corresponding period last year	1,947,253

Foreign Bank Statements.—The governors of the Bank of England made no change in the bank's minimum rate for discount, and it remains at 4 per cent. During the week, the bank gained £172,000 bullion; but the proportion of its reserve to its liabilities was reduced from 41 5-16 to 35 3-16 per cent, against 35 per cent at the same date last year. July 5th, the bank gained £36,000 bullion on balance. The weekly statement of the Bank of France shows losses of 3,250,000 francs gold and 5,000,000 francs silver.

BULLION PRODUCTION FOR 1883.

We give below a statement showing the latest bullion shipments. These are officially obtained from the companies, where that is possible; and where official statements can not be procured, we take the latest shipments published in those papers nearest to the mines reported. The table gives the amount shipped for the week up to the date given, as well as the aggregate shipments to such date from the first of January, 1883.

The shipments of silver bullion are valued at $1.29·29 per ounce troy; gold at the standard $20.67 per ounce troy. The actual value of the silver in the following table is therefore subject to a discount, depending on the market price of silver. If the price of silver be counted at $1.11 an ounce, which has for some months been about its average value, the following figures, where they relate to silver bullion, should be diminished by about 14⅛ per cent, to arrive at actual value.

MINES.	States.	Month of May.	Year from Jan. 1st, 1883.
*Alice, G. S.	Mont	77,991	$398,410
*Alta-Montana, G. L. S.	"	.....	$10,625
*Belmont	"	.....	17,775
Bodie, G. S.	Cal	9,248	100,590
Bodie Tunnel, G.	"	6,128	51,447
*Bonanza King, G.	"	.....	199,077
*Boston & Montana, G.	Mont	.....	72,318
*Central Arizona, S.	Ariz	.....	35,845
*Christy, S.	Utah	25,082	117,736
*Chrysolite, S. L.	Colo	$45,413	192,971
Cons. Bobtail	Colo	.....	18,723
*Contention, S.	Ariz	92,820	475,824
Crescent, G.	Cal	.....	13,000
*Custer, G. S.	Idaho	.....	43,572
*Deadwood-Terra, G.	Dak	.....	120,231
*Derbec Blue Gravel, G. S.	Cal	12,885	44,729
Evening Star, S. L.	Colo	.....	47,061
*Father de Smet, G.	Dak	25,120	153,105
*Frisco M. and S. Co., G. S. L.	Utah	.....	$77,084
Gunnell, S.	Colo	13,772	58,828
*Head Center Cons.	Ariz	1,207	8,109
*Head Center and Tranquillity	Ariz	24,115	42,601
*Hecla Cons., G. S.	Mont	58,938	293,922
*Homestake, G.	Dak	.....	330,060
*Hope, S.	Mont	21,389	41,963
Horn-Silver, S. L.	Utah	228,000	1,283,000
Idaho, G.	Cal	.....	88,642
*Independence, G. S.	Nev	6,048	32,991
Iron Silver, S. L.	Colo	127,109	503,831
*Kentuck, G. S.	Nev	2,156	10,393
*Lexington, S.	Mont	109,629	530,833
*Little Pittsburg, S. L.	Colo	.....	22,873
*Marguerite, G.	Cal	.....	33,200
*Martin White, G. S.	Nev	.....	136,317
Morning Star, S. D.	Colo	.....	84,428
*Moulton, G. S.	Mont	.....	123,288
Mount Diablo	Nev	52,233	127,311
*Navajo, G. S.	"	62,336	343,962
*North Belle Isle	"	45,510	1,953
Northern Belle, S.	"	.....	388,525
*Ontario, S. L.	Utah	.....	807,695
*Oxford, G.	N. S.	6,855	28,179
*Phœnix, G.	S. C.	.....	43,666
*Pinal Cons., S. L.	Ariz	25,540	163,400
*Satemo, G.	N. S.	.....	2,500
*Silver Bow, G. S.	Mont	.....	101,241
Standard, G.	Cal	71,313	442,796
Star, S.	Nev	.....	27,095
*Stormont, S.	Utah	21,377	95,658
Syndicate, G.	Cal	5,987	20,073
Tintic M. and M. Co.	Utah	.....	7,632
*Tip Top, S.	Ariz	.....	‡22,983
*Tombstone, G. S.	"	76,600	‡322,830
Wyoming Cons	Cal	.....	31,541
Yellow Jacket, S.	Nev	30,191	183,064
Total amount of shipments to date			$9,027,815

* Official. † Net value. ‡ Assay value. § Not including value of lead. *G. Gold. S. Silver. L. Lead.*

METALS.

NEW YORK, Friday Evening, July 6.

Copper.—As usual, after sales of large blocks to consumers, Lake copper has fallen into a state of quietude. Nobody wants to buy and there is very little offering, while the speculative interest has long since let the metal alone. We hear of only jobbing sales of Lake with 15⅛c. bid and 15¼c. held. In other brands, the market is quiet at the range of about 14@14½c., according to brand. There is again some inquiry from Europe, Baltimore being asked for this time. Abroad, the markets are fairly well maintained, a very encouraging feature for this metal. To-day's cables are £63 10s. for Chili Bars and £69@£69 10s. for Best Selected.

Tin.—The market is quiet and steady, the jobbing demand being good for the season. In a large way, we hear only of a sale of 100 tons at private terms. Quotations here are 21⅛@21⅝c. for spot Straits, Malacca, and Australian. England cables to-day to the Exchange, £93 5s.

Lead.—Though there has been some talk of a large transaction, the report is discredited, and no sales of any size are reported in any reliable quarter. The future of the market is looked forward to with some apprehension. Stocks here and in the West are undoubtedly accumulating, and the current demand is certainly not larger here than it was a year ago, while the output is still going on at a round rate. We quote nominally 4·40c. for Common and 4·42½@4·45c. for Refined.

Messrs. John Wahl & Co., of St. Louis, wire us as follows to-day:

Our market is firm Sales for the week sum up over 550 tons of Refined at 4·13c., and 190 tons of Common at 4·12½c.

Messrs. Everett & Post, of Chicago, telegraph:

The market remains the same, if any thing a shade weaker. Sales were 210 tons of Common at 4·15c., and 110 tons of Refined, a special brand, at 4·20c.

Spelter.—The market is extremely dull, in spite of the fact that among all metals this ore is apparently most favorably situated. Good ordinary domestic brands are freely offered here at 4·50c. England cables £15.

Antimony.—Nothing has been done. We quote Cookson's nominally 10⅝@10⅝c., and Hallett's 9⅝@9⅝c. for large lines.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, July 6.

American Pig.—The celebration of the national holiday has broken up the week and has restricted business to a small limit, though the interest has grown considerably. The diversion of business from a larger to a smaller number of furnaces is beginning to tell on the tonnage of those who have been able to meet present prices, which are, however, still so low that there is very little profit in the business. The feeling is decidedly better, and is now, too, beginning to affect No. 2 Foundry and Gray Forge. Other than standard brands of coursе are still selling at less than current quotations, but a greater desire is manifested to purchase, and it now looks as though bottom prices had been passed. Sales during the week have been small, and it will probably be some time before consumers come forward to anticipate fall demands. We quote No. 1, $21@$23.50 for good to choice grades, at tidewater; No. 2, $19@$20.50; and Gray Forge, $18@$19.50. Bessemer pig is dull, American being $20 at furnace, and Foreign $21 at tide, nominally. England cables 50s.@50s. 10d. Spiegeleisen is quiet at $31.50@$32 for 20 per cent, and $25.50@$26 for 10 to 12 per cent. The Passaic Zinc Company is building a furnace to make spiegel from zinc ore residue.

Scotch Pig.—As yet, the expectations of a growing business in Scotch Pig have not been realized. The arrivals this week were small. Freights are quoted 6s. per cable from Glasgow.

At the Exchange, the following cable quotations were received: Coltness, 60s.; Langloan, 59s. 6d.; Summerlee, 57s. 6d.; Gartsherrie, 57s.; Glengarnock, at Ardrossan, 54s. 6d.; and Eglinton, at Ardrossan, 48s. 6d. Warrants to-day were 46s. 11d. We quote here, all ex ship, Coltness, $23.50@$24; Langloan, $23.50; Summerlee, $23; Gartsherrie, $23@$23.50; Glengarnock, $22; and Eglinton, $20.50@$21.

Rails.—For summer and winter delivery, the majority of the mills can take no orders, except for small lots, and some of them are booked for the whole of the year. Nominal quotations are $38 at mill, but for winter and spring delivery, the mills accept $37 for round orders. England cables £4 15s.@£5.

Old Rails.—There are no features to note, the market being dull and lifeless at $21@$21.50 for Ts.

Scrap.—There are slight indications of an improvement. We quote $22@$22.50 ex ship.

Philadelphia. July 6.

The iron transactions of the past week have necessarily been restricted to very narrow limits. A review of the past month shows a slight improvement in foundry irons, and a good many inquiries for refined iron: but it remains to be seen whether this indication will be followed up by a more active demand. The general conditions surrounding the iron trade are unchanged, and there is but little inducement for buyers to depart from their accustomed policy. The great fact that stands before buyers is, that nothing but an extraordinary demand for iron can improve prices. Production is beyond requirements, and the only deduction from this is, that prices will be lower. On the other side, producers say that, while this logic is faultless, there is no room for a decline, either in crude or finished iron. Ever since the opening of the year, a conservative policy has been followed, buyers purchasing only for their most pressing wants and with very few exceptions, that policy has been strictly followed. Producers have taken fright, and restricted the output of crude iron. The result in the past few days is what sellers regard as an encouraging upward tendency in foundry irons. Very little will come of it during the summer. Intercourse with large consumers, both of

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	June 30.		July 2.		July 3.		July 4.		July 5.		July 6.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon.													
Amie Con., Co.			.17	.16									5,800
Argenta, Ne.													
Bar. & Walker, Ut.													
Bassick, Co.									10.12	9.00	10.25		2,200
Belle Isle, Ne.	.51								.56		.55	.47	1,100
Bodie Cons., Ca.													
Breece, Co.													
Bulwer, Ca.	.75												100
California, Ne.			.12	.10									130
Cal. & Hecla, Mich.													
Carbonate Hill.													
Caribou Con., Co.													
Chrysolite, Co.			1.15										300
Climax, Co.	.16	.12	.20	.16					.17		.17	.16	5,300
Cons. Va., Ne.	.45		.40		.35				.45	.43	.44	.40	4,500
Crown Point.													
Deadwood-Terra, Dk.													
Dunkin, Co.													
Eureka Cons., Ne.													
Excelsior, Ca.													
Father de Smet, Dk.													
Findley, Ga.													
Gold Stripe, Ca.													
Gould & Curry, Ne.	2.70												100
Grand Prize, Ne.													
Great Eastern, Dk.													
Green Mountain, Ca.	.73	.72	.70		.71						.70		2,600
Hale & Norcross, Ne.													
Hall-Anderson, N. S.													
Hibernia, Co.													
Homestake, Dk.			16.00	15.50					15.50				245
Horn-Silver, Ut.			7.50	7.00							7.00		750
Hukill, Co.													
Independence, Ne.													
Iron Silver, Co.			2.95	2.90	2.95				3.00	2.95	2.95		1,000
La Plata, Co.													
Leadville C., Co.	.52				.50								225
Little Chief, Co.													
Little Pittsburg, Co.													
Martin White, Ne.													
Moose, Co.													
Navajo, Ne.	3.10	3.00	2.85								2.50		600
Northern Belle, Ne.													
North Belle Isle, Ne.													
Ontario, Ut.													
Ophir, Ne.													
Plumas, Ca.													
Prussian, Colo.													
Quicksilver Pref., Ca.					38.12								500
" Com., Ca.			9.00										100
Rising Sun, Ca.													
Robinson Cons., Co.	.56	.55	.55	.54	.54	.53			.53	.52	.55	.53	5,100
Savage, Ne.									2.10				100
Sierra Grande, N. M.	1.25		1.25	1.20	1.20				1.15		1.20	1.10	1,800
Sierra Nevada, Ne.	3.60				3.60				4.15	3.75	3.75		850
Silver King, Ar.					10.00				10.00		10.25		250
Spring Valley, Ca.			.50										65
Standard, Ca.													
Stormont, Ut.													
Tip Top, Ar.													
Tombstone, Ar.													
Vizina, Ar.													
Yellow Jacket													

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	June 30.		July 2.		July 3.		July 4.		July 5.		July 6.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Advance.													
Albion.													
Alta.													
Alta-Montana, G.												.02	2,000
Am. Flag, s.													
Barcelona, G.													
Bear Creek.													
Bechtel Con., G.													
Belvidere.													
Best & B'licher, G. s.													
Big Pittsburg, s. L.													
Bondholder.													
Bradshaw, s.													
Buckeye													
" pref.													
Bull-Domingo, s.L.				.06	.05								1,300
Bye and Bye.													
Calaveras, G.													
Clav'r's W. & M. Co.													
Cal., B. H., G.													
Central Ariz'na, s.				.35									200
Cherokee, G.													
Climax, Co.													
Cons. Imp'r'l, G. s.													
Crowell, G.													
Dahlonega, G.				.02									1,000
Decatur.						.04							500
Dunderberg.													
Durango, G.						.05	.04						5,100
Eastern Oregon.	.60	.57	.61			.64	.58				.63		9,400
Elko Cons.	.25	.23	.25	.24		.24							3,300
Enterprise.													
Fannie Barret.													
Globe Copper.													
Gold Placer, G.													
Goodshaw, G.													
Granville, G.													
Harlem M. & M. Co.													
Hortense, s.						.10							400
Imperial.												.08	100
Lacrosse, G.				.10									100
Lucerne.													
Mariposa Pref., G.													
" Com., G.													
Mexican, G. s.													
Miner Boy.													
Mono.													
North Standard, G.													
N. Horn-Silv'r, s L.													
Ori'nt'l & Miller, s.	.15			.15									500
Parnell.	.46					.45	.41				.40		4,000
Quartz Creek.													
Rappahannock, G.				.08		.07							1,000
Red Elephant, s.	.07												2,100
Ruby, of Arizona.													
Silver Cliff, s.													
Sonora Con.				.19							19	.18	2,800
South Bodie, G.													
South Bulwer, G.													
South Hite.													
South Pacific.													
State Line, 1 & 4, s.													
" Nos. 2 & 3, s.				.03									500
Sutro Tunnel.	.21	.20				.21					.21		1,800
Taylor-Plumas.													
Union Cons., G. s.											4.75		10

Full tables giving the total amount of dividends, capital, etc., will be printed the first week of each month. Dividend shares sold, 33,615. Non-dividend shares sold, 36,200.

forge and foundry irons, shows conclusively that an active demand will not be developed until September.

No. 1 Foundry is called firm at $21@$22. Standard and special brands have been bought pretty freely, but at lower prices than those quoted. Very little is selling at these figures, though efforts are made to create the impression that they are firm, and even like to advance.

During this month, the mills will be closed down for from two to three weeks, and those not well supplied with orders will remain out longer. Hence, forge iron will be dull, and as stocks are large, it is correct to infer that prices will remain weak, though some special brands are quoted with more firmness than for several weeks past.

Bessemer iron is nominally $21.50. Scotch iron continues dull and week. Some holders are endeavoring to unload stocks by concessions of 50 cents.

Merchant Iron.—Local trade is inactive, and card rates are 2·30c.; selling prices, 2·25@2·15c.; country mills, 2·10c. Common iron, 1·75@2c. Leading firms report stocks of iron light in consumers' hands, and therefore predict an improvement during August.

All kinds of construction iron have been selling pretty freely for a month or six weeks past, and leading manufacturers are satisfied with the prospects for the fall. An improvement is probable this month, as a good deal of business is generally held over from June, especially when prices are stiff as they have been.

Plate and Tank Iron.—The situation in plate could be much better; but notwithstanding low prices, a very large amount of business has been done in the aggregate. Capacity has been pretty well engaged all spring and summer. The chief cause of complaint is low prices. A few inquiries for large lots are on the market, and if buyers' terms are accepted, orders will be placed next week. There is nothing discouraging in the trade except low prices. Consumptive inquiries have been and are large, and will probably remain so, as bottom prices have been reached.

Sheet-Iron.—Mills are entering the second half of the year with well-filled order-books, and prices are firm at card rates for small lots as usual. Large consumers who look ahead for fall requirements in June and August will be favored.

Steel Rails.—Makers report the condition of trade to be satisfactory; though profits for the past six months have not come up to the returns of former seasons, owing to the low prices. Rates are $38. Light sections are $40.

Old Rails.—Offers for shipment are made at $22, with no takers. Yards are well filled with scrap, but little is moving.

Pittsburg. July 5.

Notwithstanding some very attractive concessions made by outside makers, consumers are purchasing only for immediate requirements, and are looking for a further weakness. Several mills have closed down for repairs. There will be a longer suspension for that purpose this year than is usual. Orders are scarce, and but little activity can be reported. Quotations for Foundry are $19@$21; Mill Irons, $17@$18. Concessions of 50 cents to $1 per ton have been made.

During the past six months, facilities for making iron have been considerably increased in and about this city. A large amount of plate iron could be sold, but the offers are below cost of making.

The output of pig-iron is fully up to all requirements, but stocks are light at Alleghany County furnaces. The present week is a dull one. Very little new business is under consideration, as manufacturers and buyers prefer to let the summer dullness pass away before entering into new or large contracts.

Less Muck Bar is offered, and quotations are $34. Merchant Bar is sold as low as 1·80@1·90c.

A few small transactions have taken place in wrought-iron pipes at 70 and 10 off. Sheet-iron continues in active demand for building purposes, and prices are as low as at any time for a year. A good many specifications are expected during July and August for construction iron for Western Pennsylvania delivery, but orders will not be placed except at exceedingly low prices. The Bessemer mills are working to full capacity. Offers have been received here at $37.50, fall delivery, but no sales have yet been made at that price. Old Rails are quoted at $23 for American.

The merchant steel trade is dull. Bessemer and open-hearth grades are cut. Crop-Ends are quoted at $25. Spikes, 2·60c. Selected Wrought Scrap, $24; No. 2, $23. Wrought Turnings, $16.

The Amalgamated Association holds its annual celebration in Philadelphia, August 7th.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, July 6.

Anthracite.

The influences which seem to be at work in attempting to shape the course of the coal trade are certainly not those of legitimate supply and demand. So far as the latter is concerned, even the most violent bull of coal stocks in Wall Street will not have the audacity to maintain that it is equal to that of last year. Our manufacturing industries in the New England States, always heavy consumers of anthracite coal, are not doing nearly as much work, our factories in such large cities as New York and Philadelphia are running on half time or less, the falling off in the production of iron is affecting the consumption of anthracite in the Schuylkill and Lehigh valleys; and yet, in spite of all this, the companies want to make themselves and the public believe that the market will warrant an advance in the price of coal, in spite of an increase in the production.

Middlemen have taken considerable coal at June prices, and there are indications even that they have ordered more than they will be able to handle.

The month will probably be consumed in attempts to market this coal among the few who may be made to believe in a prospective August advance, or who may be in urgent need of coal.

From Philadelphia come reports that are significant, and confirm the opinion expressed by us some time since. Mr. Gowen, of the Philadelphia & Reading Coal and Iron Company, it is said, has been distributing copies of an agreement for signature among the individual operators in the Shamokin District to sell the coal mined for Western shipment to him, instead of consigning it themselves. The details of this scheme have not as yet been divulged; but it is obvious that it will have its advantages for the individual shippers, and will contribute to that most important end, the cheapening of the cost of the coal in Western cities, by reducing the general expenses. It can not be expected, of course, that the individual operators should enter into such an arrangement without some hesitation; but it is believed that ultimately the majority of them will accept it.

Bituminous.

Except frequent reports of forced sales of coal at low prices, there are no features to note. Business is extremely dull. We quote Clearfield $3.75@$4, while Cumberland is entirely nominal at $4.10@$4.35.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended June 30th and year from January 1st:

TONS OF 2240 LBS.	1883. Week.	1883. Year.	1882. Week.	1882. Year.
Wyoming Region.				
D. & H. Canal Co..	65,874	1,768,555	84.172	1,539,120
D. L. & W. RR. Co.	79,527	2,219,023	107,431	2,014,921
Penna. Coal Co.....	23,184	623,121	38,378	581,205
L. V. RR. Co.....	15,126	520,655	19,290	512,000
P. & N. Y. RR. Co..	3,587	97,392	4,189	95,184
C. RR. of N. J	30,317	1,178,102	59,396	1,093,045
Penna. Canal Co....	9,585	160,652	15,392	173,287
North & West Br. RR.....	.....	216,355	.....	.....
	227,200	6,784,635	328,248	6,008,762
Lehigh Region.				
L. V. RR. Co.....	66,466	2,283,504	117.131	2,171,322
C. RR. of N. J.....	46,381	1,105,683	55,340	996,574
S. H. & W. B. RR..	.....	23.680	.....	20,000
	112,847	3,412,867	172,471	3,187,896
Schuylkill Region.				
P. & R. RR. Co	95,371	3,234,452	175,939	2,922,568
Shamokin & Lykens Val.....	34,555	659,098	29,252	546,017
	129,926	3,893,550	205,191	3,468,585
Sullivan Region. St Line&Sul.RR.Co.	810	29,927	1,627	27,070
Total	470,783	14,120,979	707,537	12,692,313
Increase.....	.....	1,428,666	.....	.....
Decrease.....	.....	.....	.....	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Total same time in 1878	7,058,738	tons.
" " " " 1879	11,514,593	"
" " " " 1880	9,914,544	"
" " " " 1881	11,921,724	"

The increase in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 355,174 tons, as compared with the corresponding period in 1882.

Belvidere-Delaware Railroad Report for the week ended June 30th:

	Week.	Year. 1883.	Year. 1882.
Coal for shipment at Coal Port (Trenton)	3,072	45,933	32,575
Coal for shipment at South Amboy.....	10,137	400.979	396,701
Coal for distribution.....	11,320	385,734	349,111
Coal for company's use	2,592	72,992	63,792
Total	27,121	905,638	842,179
Increase...	.....	63,459	.....
Decrease.....	.....	.....	.....

The Transportation of Coke over the Pennsylvania Railroad for the week ended June 23d and year from January 1st:

Tons of 2000 lbs.	Week.	Year.
Penn. RR. (Alleghany Region).....	526	49,426
West Penn. RR	2.003	51,413
Southwest Penn. RR	42,742	968,194
Penn. & Westmoreland Region, Pa. RR	4,066	110,196
Pittsburg, Penn. RR.....	31	454
Snow Shoe (Clearfield Region)..... .	489	9,971
Total	49,857	1,189,654

The Production of Bituminous Coal for the week ended June 23d was as follows:

Tons of 2000 lbs., unless otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2240 lbs..... ...52,233		1,047,807
Barclay Region, Pa.		
Barclay RR., tons of 2240 lbs.	5,401	154,138
Broad Top Region, Pa.		
Huntingdon & Broad Top RR....	2,758	95,071
East Broad Top.....	555	22,255
Clearfield Region, Pa.		
Snow Shoe.	3,690	117,258
Tyrone and Clearfield..... . . .	58,531	1,323,046
Alleghany Region, Pa.		
Pennsylvania RR..	5,049	218,479
Pittsburg Region, Pa.		
West Penn RR.....	4,886	218,788
Southwest Penn. RR.....	1,249	53,328
Penn & Westmoreland gas-coal,Pa. RR	19,152	662,414
Pennsylvania RR	14,276	238,558
Total....	167,778	4,151,142

FREIGHTS.

Coastwise Freights.

Per ton of 2240 lbs.

Representing the latest actual charters to July 2d.

PORTS.	From Philadelphia.	From Baltimore.	From Elizabethport, Port Johnston, South Amboy, Hoboken, and Weehawken.
Alexandria.....	.75	....	.....
Annapolis.... ...	.....	....	.....
Albany.....	.....	....	....
Baltimore	.50§	....	....
Bangor.....	1.50	....	....
Bath, Me.....	1.40@1.45	1.55	....
Beverly..... ...	1.40@1.45	....	....
Boston, Mass.....	1.40@1.50	1.60	1.20@1.25
Bristol.....	1.25	....	....
Bridgeport,Conn.	.....	1.40	.55
Brooklyn	.85§	1.35	....
Cambridge, Mass.	1.50@1.60‡	1 70	1.20@1.25
Cambridgeport ..	1.50@1.55‡	1.70	....
Charleston, S. C..	.75	.75	....
Charlestown.....	1.45	1.60	1.20@1.25
Chelsea.....	1.45	1.60	1.20@1.25
City Point.....	.....	....	....
Com. Pt., Mass...	1.50@1.55	1.70	.....
E. Boston..	1.40@1.50	1.60	1.20@1.25
East Cambridge.	1.50@1.55	1.70	1.20@1.25
E.Gr'nwich,R. I.	1.25	1.45	.80@.85
Fall River.....	1.20@1.25	1.45	.80
Galveston.....	.....	3.00	.....
Gardiner, Me ...	.....	....	.....
Georgetown, D.C.	.75	....	.....
Gloucester.....	1.50@1.55	....	....
Hartford..... ...	....	....	.. ..
Hackensack	....	....	.....
Hudson..... ...	1.00§	....	..... .
Lynn	1.60@1.65	1.85	....
Marblehead.....	.....	1.85	.....
Medford.....	....	....	....
Millville, N. J....	.....	....	.....
Milton.....	....	....	....
Newark, N. J.....	....	1.40	.....
New Bedford	1.20@1.25	1.45	.90
Newburyport	.. ..	1.80	1.35
New Haven.....	....	1.40	.55
New London.....	....	1.40	.70
New-Berne.....	....	1.25	.....
Newport.....	1.25	1.45@1.50	.80
New York.....	.85§	1.25	....
Norfolk, Va	.65	....	..... .
Norwich.....	....	1.60	.75
Norwalk, Conn ..	....	1.55	.55@.60
Pawtucket.....	....	1.55	... ...
Philadelphia.	....	....	....
Portland..... ...	1.40@1.45	1.60	1.20
Portsmouth, Va..	.60@.65	.70	.....
Portsmouth,N.H.	1.60@1.65	1.70	1.30
Providence.....	1.20@1.25	1.45	.80
Quincy Point....	1.55@1.60	1.70	....
Richmond, Va....	.80@.85	....	....
Rockland, Me....	....	1.65	....
Rockport	1.65@1.70	1.65	....
Roxbury, Mass...	1.40@1.45	1.65	....
Saco.....	....	1.80	1.10†
Sag Harbor.....	....	....	....
Salem, Mass.....	1.65@1.70	1.70	1.25
Saugus	1.60	....	....
Savannah... ...	....	1.00	....
Somerset.	1.20@1.25	1.50	....
Staten Island....	....	....	....
Trenton.....	....	....	....
Troy.....	1.00§	....	....
Wareham..... .	... .	1.70	... ...
Washington.....	.75	....	....
Weymouth..... ..	.....	1.80	....
Williamsbg, N.Y.	.....	1.35	....
Wilmington, Del.	.....	....	....
Wilmington, N.C.	.80	1.00	.....
St. Thomas, W. I.	.....	....	....

* And discharging. † And discharging and towing. ‡ 3c. per bridge extra. § Alongside. ‖ And towing up and down. ¶ And towing. ** Below bridge. †† Towing and pilotage, $75. H Hoboken.

Rates firm. Tonnage in demand.

BALTIMORE, July 2, 1883. GEORGE W. JONES & Co.

Circular Prices of Anthracite Coal Delivery, f. o. b., at Tide-Water Shipping Ports, per ton of 2240 lbs.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
WYOMING COAL.	$	$	$	$	$	$
Pittston at Newburg.....	3 95	3 95	3 90	4 00	4 20	4 25
Scranton at Hoboken..... .	3 90	3 90	3 90	4 15	4 45	4 55
Lackawanna at Weehawk'n	3 90	3 90	3 90	4 15	4 45	4 60
Wilkes-Barre at P. Johnston	3 90	3 90	3 90	4 15	4 45	4 45
Plymouth R. A. at P. John.	.....	4 25	....	4 45	4 90	4 50
LEHIGH COAL.						
Honey Brook at Port John.	5 00	4 25	... .	4 40	4 45	4 45
Fulton at South Amboy....	5 25	4 40	.....	4 40	4 30	4 40
U.L.&Coun.Ri'ge at Eliz'pt	.....	.....	.....	.....	... .	....
SCHUYLKILL COAL. *At Elizabethport.*						
Hard White Ash..... ...	4 85	4 85	... .	4 25	4 60	4 35
Free-Burning White Ash...	.....	3 90	.....	4 15	4 60	4 35
Schuylkill Red Ash.....	.....	.....	... .	4 25	4 80	4 35
Shamokin.....	.. .	.....	.....	4 40	4 80	4 45
Lorberry.....	.....	.....	.....	4 55	5 00	4 45
Lykens Valley (Brookside).	. ..	.....	4 85	5 15	5 50	5 15
At Port Richmond, Philadelphia, for shipment to points beyond Capes of the Delaware.						
Hard White Ash.....	4 50	4 50	3 75	3 90	4 25	4 00
Free-Burning White Ash...	.....	3 55	3 55	3 80	4 25	4 00
Schuylkill Red Ash	.....	.....	...	3 9	4 45	4 00
Shamokin....	.....	.....	.....	4 05	4 45	4 10
Lorberry.....	.....	.....	. .	4 05	4 55	4 10
Lykens Valley (Brookside).	.....	... .	4 35	4 65	5 00	4 65

Jermyn coal, at Hoboken, is quoted per ton of 2240 lbs.: Lump, $3.90; Steamer, $3.90; Broken (grate), $3.90; Egg, $4.15; Stove, $4.45; Chestnut, $4.45; Chestnut, No. $23.

Wholesale Prices of Bituminous Coal.

Clearfield, at Philadelphia.....	$3.10@$3.25
" " South Amboy.....	3.80@ 3.90
" " New York, alongside.....	4.10@ 4.25
Cumberland, at Baltimore.....	3.15@ 3.25
" " Georgetown...	2.90@ 3.10
" " South Amboy....	4.00@ 4.20
" " New York, alongside...	4 20@ 4.40

Horsford's Acid Phosphate

Makes a Cooling Drink.

Into half a tumbler of ice water put a tea-spoonful of Acid Phosphate; add sugar to the taste.

WANTED.—A COPY OF TREATISE ON Ore-Deposits, by Bernard von Cotta, translated by Frederick Prime, Jr., new or second-hand. Address, giving price, E. W. F., P.O. Box 1833, New York.

MAPS.

IDAHO.—The Wood River Region of Central Idaho, giving the first correct Geography of that recently explored and remarkable Belt of Discoveries of Gold and Silver Mines on the tributary streams of the WOOD and LITTLE WOOD Rivers, on the Upper Waters of the SALMON RIVER, among the SAWTOOTH MOUNTAINS, and on the Forks of the BOISE RIVER; embracing the Mount Estes and Custer Mines on the north and the Oregon Short Line Railroad on the south. Prepared by Frank J. Scott. Scale, 5 miles to the inch. Size, 15 x 26 inches. In paper pocket Price, $1.

MEXICO.—Map of Mexico. Showing Railroads, Broad Gauge and Narrow-Gauge, Constructed; and Railroads, Broad-Gauge and Narrow-Gauge, Proposed. This very large and finely-engraved Map, constructed originally by the government for official purposes, contains all the information obtainable by it, and shows minutely the towns and villages of the entire country. Scale: 26·6 Mexican Leagues to the degree, and 69·16 English Miles to the degree; also, Kilometrical Scale. 1881. Size, 53×41 inches. Printed in colors. Pocket form, $5.

MAP OF MINING CLAIMS ADJOINING LEADVILLE, California Mining District, Lake County, Colo. By Edward Rollandet. 1879. Mounted on muslin, $2.50. In cloth-bound covers, $2.

MINING MAP OF UTAH.—Showing the location of the Mining Districts, over an extent of territory 150 miles from North to South. Compiled from U. S. Government Surveys and other authentic sources. Scale, one inch to four miles. Colored. 1879. Pocket form. $1.50.

NEW SECTIONAL AND MINERAL MAP OF UTAH.—Pocket form. Compiled from the latest U. S. Government Surveys and other authentic sources, exhibiting the Sections, Fractional Sections, Counties, Cities, Towns, Settlements, MINING DISTRICTS, Railroads, and other internal improvements. Scale, one inch to eight miles. Colored, 1878. $3.50.

POCKET MINING ATLAS OF THE MINES OF THE UNITED STATES.—Showing the Mines of NEVADA: the Comstock Lode, the Eureka, Treasure Hill, and Tuscarora Districts; CALIFORNIA, including Map of the Bodie District; COLORADO, including the Leadville, Silver Cliff, San Juan, Caribou, and Central City Districts; DAKOTA, including Map of Deadwood; MONTANA, IDAHO, UTAH, ARIZONA, NEW MEXICO, LAKE SUPERIOR REGION, the SOUTHERN STATES. 1880. Printed in colors, and bound in flexible leather covers. Price, $1.